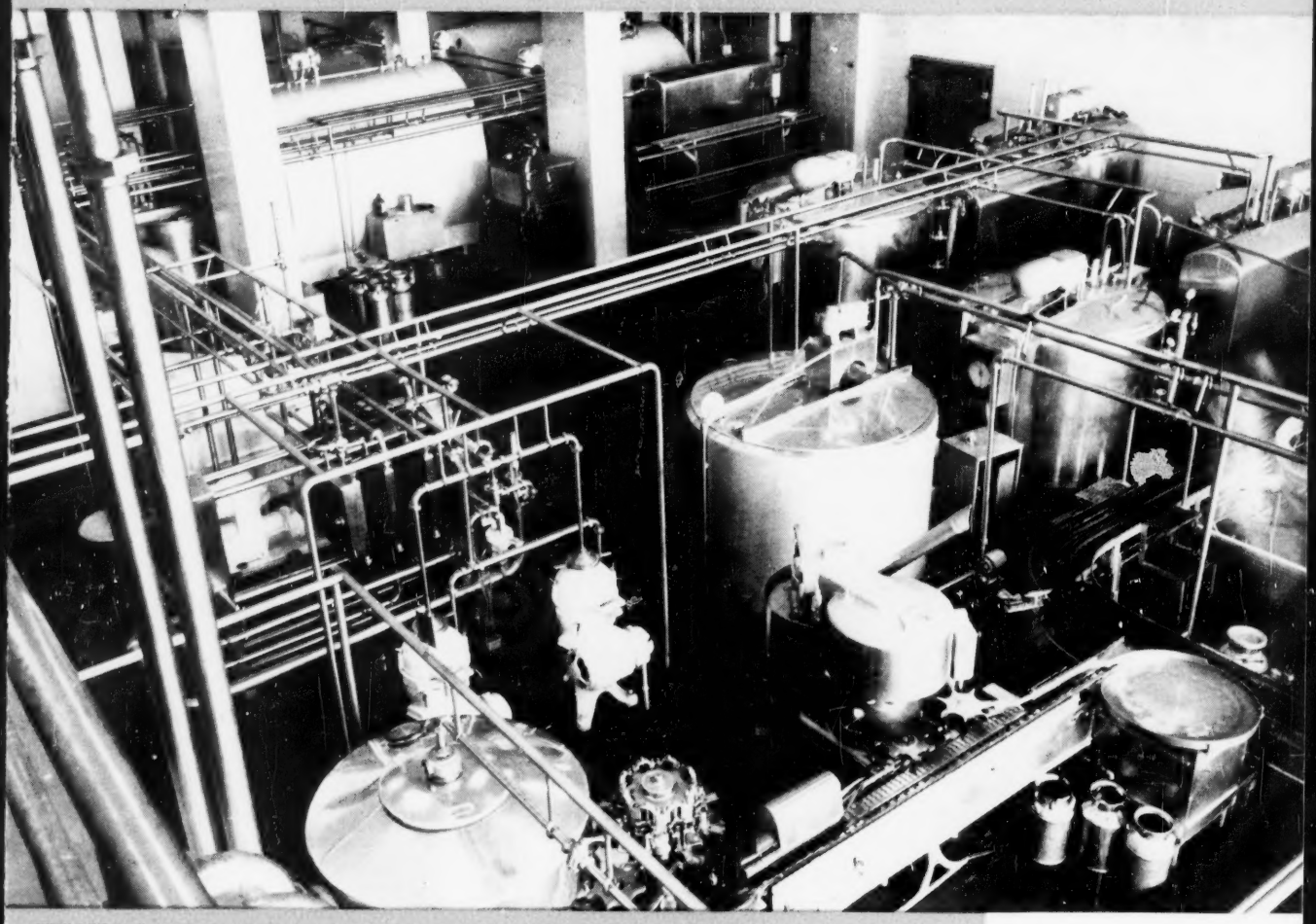
# FOOD ENGINEERING

January 1953

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

35 CENTS



PIPELINES in Damascus dairy are now efficiently cleaned in place — and no costly redesigning was necessary. (Page 82)

*In This Issue:*

**FREEZING PLANT ENGINEERING . . 68**
Bag-Borne Bacteria . . 57
Cracker Jack Today . . 59
New Vanilla Flavor . . . 62
Baker Vetoes Motion . 64
Power Pinch Ended . . 67
Neat Brewery Pays . . 74
Compartmentized Car 77
Sifting-Screen Tips . . 78
Profits by Accounting 80
Speeds Fudge Line . . 87
New Beverage Units . . 88
'53 Hearth Baking . . . 90
Mill Model Saves . . . . 93
Cooling Vegetables . . 94
Oil-Plant Safeguards . . 96
Pumps Syrup Easier . . 98
Moves Meat Faster . . 125
Pallet-Sped Bottling . . 127
Better Truck Body . . . 129

*Use the Free*

READER SERVICE

. . . for help on your job. It brings needed data on equipment, supplies — also useful catalogs

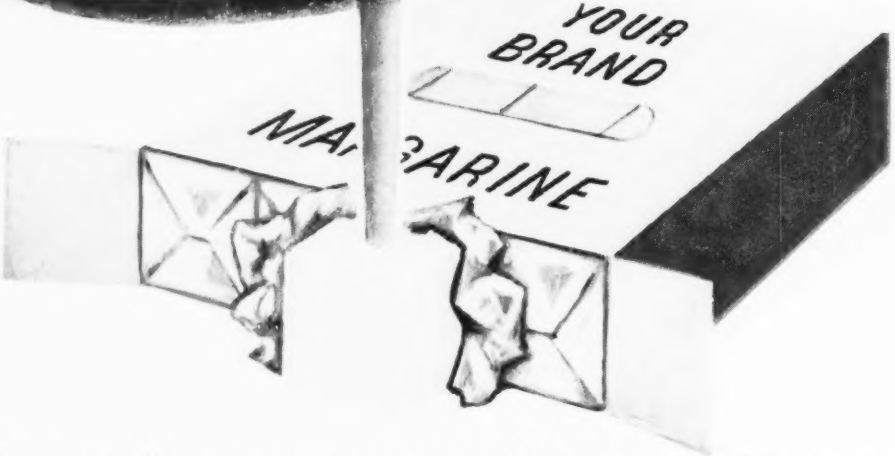
Card Inside Back Cover

# VITAMIN A-AND-COLOR
## FOR MARGARINE

**COMBINED IN ONE PRODUCT**

Batch-Packed for Easy, Accurate and Economical Fortification and Coloring of Margarine

ANOTHER *Sterwin* FIRST!




Now . . . Sterwin introduces a product which combines Vitamin A Palmitate and F. D. & C. Yellow in Vegetable Oil, batch-packed to fortify and color margarine to your formula requirements. Sterwin Vitamin A and Color is a stable, true solution that mixes thoroughly and uniformly. No measuring. No weighing. Simply add one can to each batch. Does not affect the flavor or odor of the finished product.

Each shipment is compounded with pharmaceutical care. It is then assayed for both Vitamin A and color content before a Sterwin control number is assigned.

*For further information and samples, write to:*

**Sterwin Chemicals INC.**

Subsidiary of Sterling Drug Inc.
1450 BROADWAY, NEW YORK 18, N. Y.

*Pioneers in Food Enrichment*

*Also Available*

**VITAMIN A PALMITATE & ACETATE**
In bulk or batch-size containers
**PURE, OIL SOLUBLE F. D. & C. COLORS**
to meet formula requirements
**CRYSTALLINE VITAMIN $D_2$ (Calciferol)**
In bulk or in combination with Vitamin A and Color

**BRANCH OFFICES: Atlanta, Buffalo, Chicago, Dallas, Kansas City (Mo.), Los Angeles, Minneapolis, Portland (Ore.), St. Louis**

# Food Engineering

Vol. 25 • JANUARY, 1953 • No. 1

PUBLISHER *Edwin D. Fowle*
EDITOR *Frank K. Lawler*
ASSOCIATE EDITOR
*A. V. Gemmill*
ASSOCIATE EDITOR
*C. R. Havighorst*
*San Francisco*
MANAGING EDITOR
*Herb Powell*
ASSISTANT EDITOR
*John V. Ziemba*
ASSISTANT EDITOR
*F. W. McCarthy*
ASSISTANT EDITOR
*Lloyd E. Slater*
*Chicago*
ASSISTANT EDITOR
*Ivan C. Miller*
ART EDITOR
*Priscilla A. Truax*
EDITORIAL ASSISTANT
*Paul F. Mundt*
CONSULTING EDITORS
*S. D. Kirkpatrick*
*R. S. McBride*
WASHINGTON
*G. B. Bryant, Jr.*
WORLD NEWS
*J. K. VanDenburg, Jr.*
ECONOMICS DEPARTMENT
*Dexter M. Keezer*
SALES MANAGER
*G. E. Riddell*

• • •

**FOOD ENGINEERING**
**(Formerly Food Industries)**

**January 1953 Vol. 25, No. 1**

Member ABC and ABP

Published Monthly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office 99-129 N. Broadway, Albany 1, N. Y.**

**Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York, 36, N. Y.** Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President & Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Div.; Ralph B. Smith, Vice-President and Editorial Director; Nelson Bond, Vice-President & Director of Advertising; J. E. Blackburn, Jr., Vice-President & Director of Circulation.

**Subscriptions: Address correspondence to Food Engineering—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.**

**Subscriptions are solicited only from the executives, engineers, and technologists in food processing plants. Position and company connection must be indicated on subscription orders.**

Single copies 35c. Subscription rates—U. S. and possessions $2 for 1 yr., $3 for 2 yr., $4 for 3 yr. Canada, $3 for 1 yr., $4 for 2 yr., $5 for 3 yr. Other Western Hemisphere countries $10 for 1 yr., $16 for 2 yr., $20 for 3 yr. All other countries, $15 for 1 yr., $25 for 2 yr., $30 for 3 yr. Entered as 2nd class matter Aug. 26, 1948, at Post Office at Albany, N. Y. under Act of Mar. 3, 1879. Printed in U.S.A. Copyright 1953 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved.

## FEATURE ARTICLES


| | | Baking | Beverages | Cereals | Confectionery | Dairy | Fruits, Vegetables | Meats, Fish | Other Foods |
|---|---|---|---|---|---|---|---|---|---|
| Pinning Down Bag-Borne Bacteria | 57 | • | | • | • | • | • | • | • |
| Engineers Keep Price at 5c. | 59 | | | • | • | | | | • |
| Better Artificial Vanilla Flavor | 62 | • | • | • | • | • | | | • |
| Motion Minus—Output Plus | 64 | • | • | • | • | • | • | • | • |
| Plant Power Pinch Ended by High-Voltage Setup | 67 | • | • | • | • | • | • | • | • |
| Top-Rank Quick-Freeze Operation (Process Report) | 68 | | | | | • | • | • | |
| Show-Place Is Safe Place | 74 | • | • | • | • | • | • | • | • |
| Compartmentized Car | 77 | | • | • | • | • | • | • | • |
| Picking Proper Screens for Most Efficient Sifting | 78 | • | • | • | • | | | | • |
| Accounting Your Way to Bigger Profits | 80 | • | • | • | • | • | • | • | • |
| Benefits of Cleaning Pipelines in Place | 82 | | • | | | • | | | • |
| Improved Candy-Handling Doubles Output | 87 | | | | • | | | | |
| Panorama of New Beverage Units | 88 | | • | | | | | | |
| Hearth Baking Goes Modern | 90 | • | | | | | | | |
| Process Revisions "Come Alive" | 93 | • | • | • | • | • | • | • | • |
| Quick Cooling Cuts Fresh Vegetable Losses | 94 | | | | | | • | | |
| Detectors End Flame Hazards | 96 | | | | | | | | • |
| Conditions Product for Pumping | 98 | • | • | • | • | • | • | | • |
| New Fast Pea-Freezing Line (Foldout) | 118 | | | | | • | • | • | |
| Output Up 50% by Mechanizing | 125 | | | | | | | • | |
| Boosts Output, Deliveries, Sales the "Pallet Way" | 127 | | • | | | • | | | |
| Walk-In Truck Speeds Deliveries | 129 | • | • | | | • | | • | |


## NEW EQUIPMENT & SUPPLIES


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Auto-Filler for Paper Milk Containers | 99 | | | | | • | | | |
| Copper-Clad Steel Plate Has Many Applications | 99 | • | • | • | • | | • | | • |
| Totally-Enclosed Motor Is Self-Cooling Unit | 99 | • | • | • | • | • | • | • | • |
| Machine Cuts, Wraps Individual Butter Patties | 100 | | | | | • | | | |
| Tubular Steel Pallet Is Easy to Handle | 100 | • | • | • | • | • | • | • | • |
| Transmitter for Automatic Control System | 101 | • | • | • | • | • | • | • | • |
| Gear Drive Provides Intermittent Motion | 101 | • | • | • | • | • | • | • | • |
| Pulverizing Mill Handles Variety of Feed Sizes | 103 | | • | • | | | | | • |
| Scoop-Rotor Pump Handles Powder Solutions | 103 | • | • | • | • | | | | • |
| Electronic Unit Controls Fractional Hp. Motors | 103 | • | • | • | • | • | • | • | • |
| Air Operated Pump for Liquid Foods | 105 | | • | • | • | • | • | | • |
| Fork-Lift Truck Operates in Narrow Aisles | 105 | • | • | • | • | • | • | • | • |
| Burners Add Flexibility in Use of Fuel Oil | 105 | • | • | • | • | • | • | • | • |
| Hydraulic System Provides Accurate Positioning | 107 | • | • | • | • | • | • | • | • |
| System Speeds Inter-Floor Load Movements | 107 | • | • | • | • | • | • | • | • |
| Automatically Applies Container Lids, Seals | 107 | | • | | • | | • | | • |
| Panel Automatically Cuts-In Emergency Supply | 109 | • | • | • | • | • | • | • | • |
| Continuous Unit Weighs, Moves Powdered Materials | 109 | • | • | • | | | • | | • |
| Scale Feeder Is Accurate, Flexible, Compact | 111 | • | | • | • | | • | | • |
| Gage Provides Fast Check on Pressure Instruments | 111 | • | • | • | • | • | • | • | • |
| Lightweight Dockboard Expedites Loading | 113 | • | • | • | • | • | • | • | • |
| Unit Automatically Prints Copy on Shipping Cases | 113 | • | • | • | • | • | • | • | • |
| Portable Conveyor Unit Is Light and Strong | 113 | • | • | • | • | • | • | • | • |
| White Conveyor Belting Has Poly-Vinyl Coating | 113 | • | • | • | • | • | • | • | • |
| Removable Chop-Block Features Meat Table | 113 | | | | | | | • | |
| Plastic Resin Finish Resists Corrosion | 115 | • | • | • | • | • | • | • | • |
| Fast Drying Enamel Sets in Minutes | 115 | • | • | • | • | • | • | • | • |
| White Plastic Coating Used on Rubber Gloves | 115 | • | • | • | • | • | • | • | • |


## PRACTICAL IDEAS


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Unique System Removes Condensate | 5 | | | | | | • | • | • |
| Quick-Acting Float Control | 5 | | • | | • | • | • | • | • |
| Speed Up of Insect-Fragment Count | 7 | • | | • | • | • | • | • | • |
| Thin Wood Sawing Made Easy | 7 | • | • | • | • | • | • | • | • |
| Anti-Churn Timer | 7 | | | | | • | | | |
| Rules for Safe Conveyor Operation | 9 | • | • | • | • | • | • | • | • |
| Safety Device Prevents Crank Loss | 9 | • | | • | • | | • | • | • |
| Lids Secured by Barb Perforations | 9 | | | | • | • | | | • |
| Accurate Moisture Determination Unit | 11 | • | • | • | • | • | • | • | • |
| Device Catches Unretorted Crates | 11 | | | | | | • | | |
| Cure for Scorched Bread Loaves | 11 | • | | | | | | | |
| Novel Method of Labeling | 13 | • | | • | | | | | • |
| Simple Temperature-Humidity Control | 13 | | • | | • | • | • | • | • |


## OTHER DEPARTMENTS


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| In Behalf of Progress | 116 | Hors d'Oeuvres | 185 | • | • | • | • | • | • |
| New Packages & Products | 138 | Schedule of Events | 189 | • | • | • | • | • | • |
| Advances in Technology | 149 | Recent Inventions | 192 | • | • | • | • | • | • |
| Questions & Answers | 162 | Men & Companies | 196 | • | • | • | • | • | • |
| Useful New Books | 174 | Just Off the Press | 201 | • | • | • | • | • | • |
| Keeping Up With Field | 181 | Advertisers Index | 214 | • | • | • | • | • | • |
| Output & Price Index | 181 | Reader Service | Opp. 216 | • | • | • | • | • | • |


INDUSTRY INDEX

ALLIS-CHALMERS
COMPLETE
DRIVES

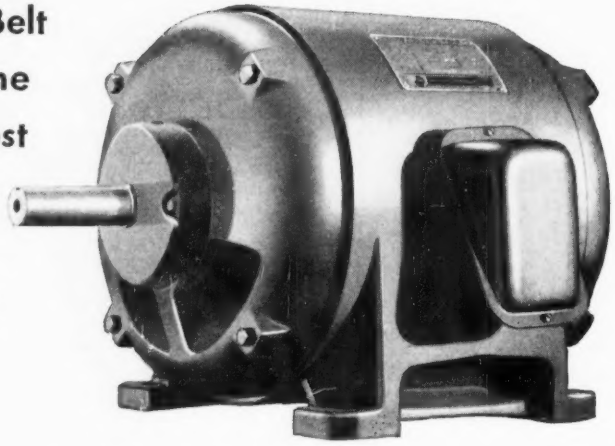
# Simplify

# YOUR DRIVE DESIGN PROBLEMS

**Allis-Chalmers Matched Motors, Control and V-Belt Drives Save Design Time and Cut Installation Cost**

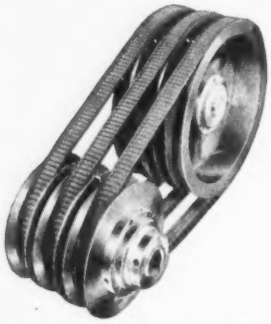
## CONTROL

Complete matched control for any motor, including manual and magnetic starters, pushbuttons, and variable speed control.



## MOTORS

Standard open drip-proof, splash-proof, totally-enclosed, fan-cooled and explosion-proof, ½ hp and up. Also wound rotor and direct current. Special motors to meet your requirements.



## Texrope V-BELT DRIVES

Fixed speed and *Vari-Pitch* sheaves with stationary or motion control. Famous grommet belt construction. Most complete line of V-belt drive equipment in the industry.

**Get the Kind of Help You Need**

Allis-Chalmers representatives in every industrial center are at your command. Just call the office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin for helpful literature.

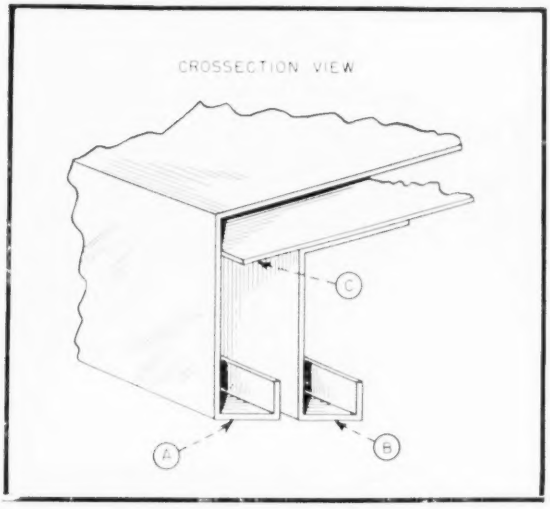
| | |
|---|---|
| Allis-Chalmers Motors and Control | 51B6052 |
| *Texrope* V-Belt Drives | 20B6051 |

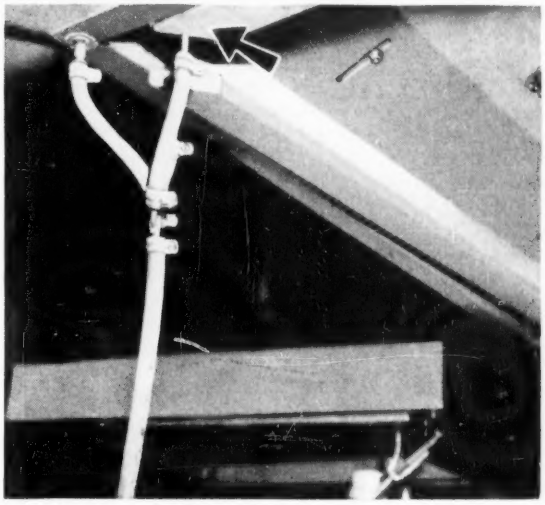
*Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

A-3780

# ALLIS-CHALMERS

# PRACTICAL IDEAS



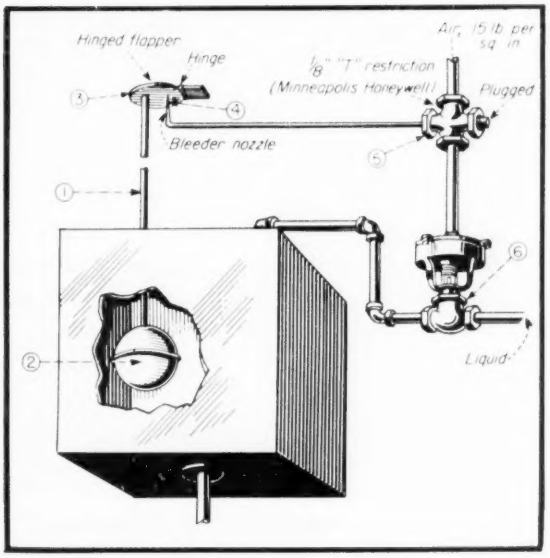
## Unique System Removes Condensate

By installing two hoods—one within the other—over our sauce cooking kettles, we have put an end to the companion nuisances of steamy atmosphere and dripping condensate in the plant.

Hood assembly is constructed with outside shell of the condensate collecting device, which is similar in shape to most exhaust hoods. Exception is that the bottom edge is flanged to form a trough—(A) in sketch—in which moisture, condensed on the outer hood, collects.

Inner hood is similar in shape to the outer, with bottom also flanged to form a trough (B). However, the slanting roof of the inner hood extends beyond the vertical side (C), so that moisture condensed between the hoods can only drop into trough (A). Whatever moisture condenses on the underside of the inner hood is collected in trough (B).

Now, at opposite corners of the hooding device, metal tubing (photo) is brazed to jointed corners (arrow) of troughs. This provides drains for condensate as it collects. Rubber hose attached over tubing carries waste water to the sewer. No steam escapes into the plant and no condensate drips back into kettles or onto the floor.—*Myron Boglisch, Maintenance Supt., Lamont Temple, Frank Bartlett, Mechanics, C. F. Heublein & Bro., Inc., Hartford.*




## Quick-Acting Float Control

Using fabricated assembly, including pressure regulating valve, air-bleeder nozzle and hinged covering, we have improvised a float control that is very sensitive to change of level and quick acting in response.

Many mechanically operated float valves, we found, did not control liquid level accurately. Often in cases of sudden increased demand, a considerable drop of float was necessary before feed valve opened sufficiently to compensate for rapid draining of the reservoir. And further, having dropped to low-level position, the float remained stationary until demand changed.

Most objectional feature was occasional "sticking" of valve mechanism with valve in open position.

To meet extremely accurate requirements for a gravity feed tank float control, we improvised an assembly which not only is highly accurate in operation but one which has never failed to function. How it is made follows.

A rod—(1) in sketch—attached to a float (2) of sufficient size, extends through a guide sleeve attached to top of the reservoir. Upper end of this rod engages a hinged covering (3), which is lowered slightly as the rod is moved downward by the float.

When liquid in the reservoir is at normal level, float rod holds the flapper slightly above bleeder nozzle (4). In uncovered position, nozzle drains air from the system as fast as admitted through the T restriction (5). Pneumatic coil valve (6), controlling reservoir feed, remains closed.

However, when tank level is lowered—by a mere fraction of an inch—flapper closes the bleeder orifice. This builds pressure against valve (5), opens it, and admits liquid to the reservoir. Even when variations in demand are great, this control system holds reservoir level within very small limits.—*P. A. Williams, The F. & W. Mfg. Co., Inc., Buffalo.*

**as the need for bulk liquids has grown,** new GATX tank cars have been designed, built and operated by General American

*The GATX fleet of 45,000 tank cars contains more than 200 specialized types to meet the needs of bulk liquids shippers.*

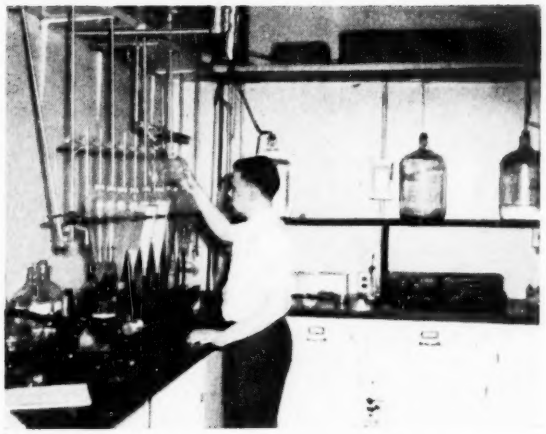
GATX GENERAL AMERICAN TRADE MARK

**GENERAL AMERICAN TRANSPORTATION CORPORATION**

*135 S. La Salle Street, Chicago 90, Illinois*
*Offices in all principal cities*



For more information, use coupon on last page.



## Speed Up Of Insect-Fragment Count

Greatly decreased is time required for insect-fragment determination since we adopted an "assembly line" procedure to conduct the normally tedious flotation method.

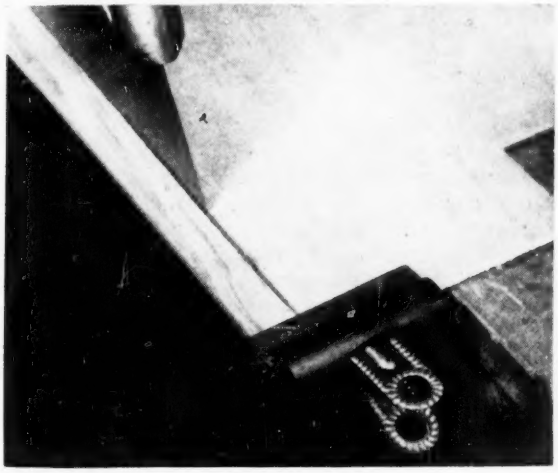
Here is the procedure:

In a stand rack we line up ten separatory funnels, all draining into a common trough. Adjacent are heaters and reagents, the latter interconnected by glass tubing and rubber hose, for use at any of the funnels if necessary.

In a typical procedure, flour samples are placed in beakers and acid added through a stop-cock funnel. Next in a nearby hot water bath, flour is gelatinized, then flotation oil added through an overhead pinch-cock.

Following pouring of beaker contents into separatory funnels, flour layer—forming in the lower portion of funnel—is drained off into a common trough. This leaves fragment-bearing oil layer in the funnel.

Fragments are separated from oil by suction filtration and quickly rinsed by water from a rubber hose which reaches all ten filters.—*C. F. Buck, Chief Chemist, Flour Mills of America, Kansas City, Mo.*



## Thin Wood Sawing Made Easy

Clatter and vibration normally accompanying hand sawing of thin plywood can be avoided by a simple means. Just slip a strong spring clamp (see photo) across the saw cut to firmly hold the salvage or cut off strip in place. With vibration thus prevented, sawing is faster and danger of breakage near end of cut reduced.—*C. T. Bower, London, England.*

## $50 Extra for Best Item

**You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.**

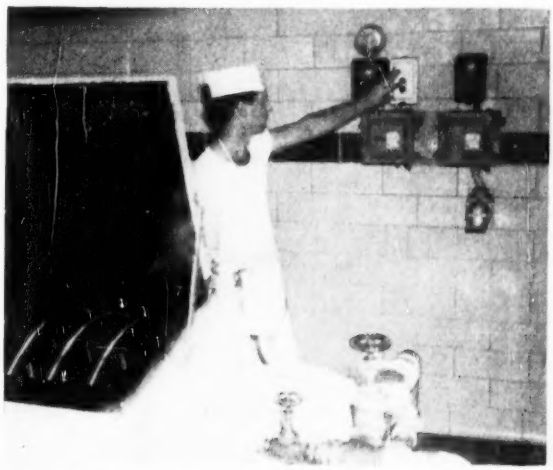
**Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).**

**Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.**

**You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.**

**Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.**

**NOVEMBER PRACTICAL IDEA voted best was "Way to Mend Stainless Tank Leaks," submitted by W. A. Free, Jr., Hungerford Packing Co., Hungerford, Pa. Outlined was a practical procedure for securely sealing leaks caused in stainless tanks by the action of salt brine.**



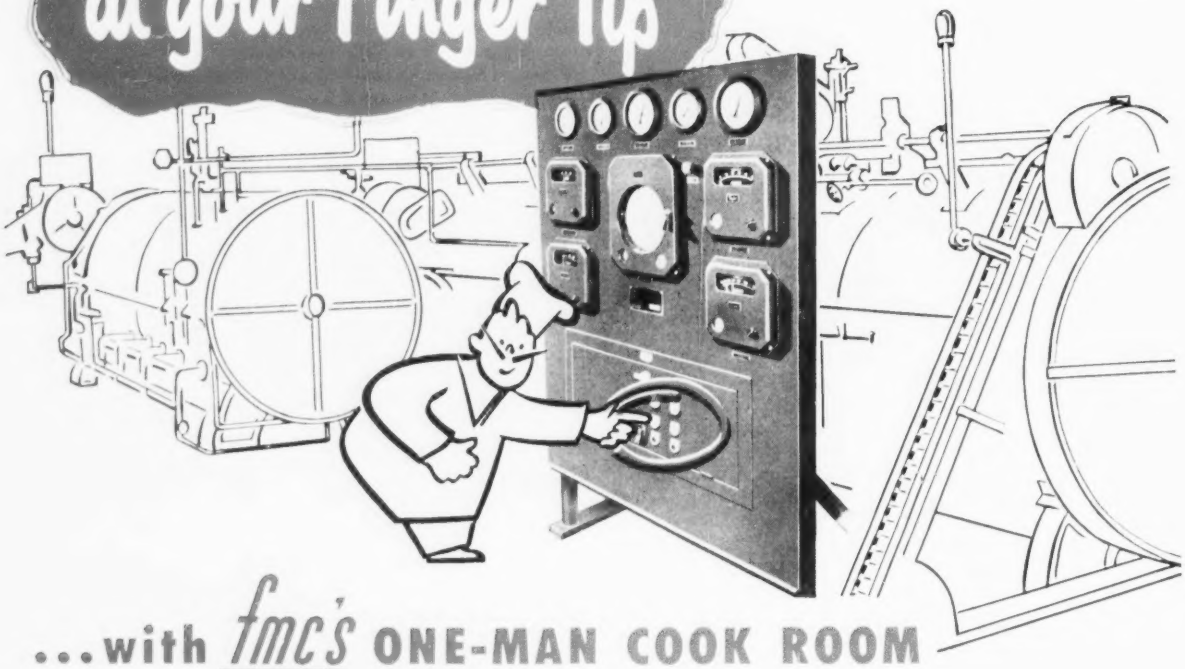
## Anti-Churn Timer

In our cheese making operation we drain over 250,000 lb. of whey from vats daily. This byproduct is then separated and the fat-free whey run to an adjacent condensory. Whey cream, however, comes from the separator in a trickle. Our problem was how to effectively cool and store this accumulating cream until ready for batch churning.

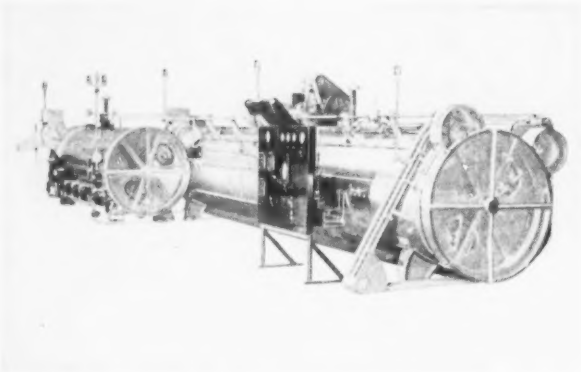
While we could run the whey cream into a coil vat—equipped with a rotating sweet-water supplied cooling coil—action of the cooling agitator over a protracted time would cause an undesired churning of the cream.

To solve this problem we wired the coil drive motor of our 3,200 lb. whey cream receiving vat through an electric timer (see photo) which automatically starts rotation of the coil every half hour and stops it after a 4 min. run. Though the effect of this system is to properly mix and cool the cream without churning, we have also noticed improved quality in the butter.—*Joe Peterson, Asst. Plant Mgr., Lake-to-Lake Dairy Co-operative, Kiel, Wis.*

# Controlled Cooking at your Finger Tip



## ...with fmc's ONE-MAN COOK ROOM



FMC *STERILMATIC* Cooker and Cooler lines are constructed in several shell combinations to meet the demands of a variety of products requiring extremely long or short cooks.

Through this centralized instrument board, "nerve-center" of the FMC *STERILMATIC** Pressure Cooker and Cooler, the operator has complete and accurate finger-tip control through every stage of sterilizing and cooling.

Because the cooker operates at high speeds and temperatures, this positive control is essential in maintaining a uniform quality pack—with every can *evenly* cooked, and cooked *exactly alike*. This feature, combined with many other outstanding developments of modern FMC *STERILMATIC* cooking and cooling equipment, provides the nation's leading canners with the most advanced food processing lines available today. Get full details on FMC's "one-man cook room," for complete processing control at greatly reduced costs.

*TRADE MARK

*Write for new booklet describing modern FMC Continuous Cookers and Coolers —now available on request.*

**FOOD MACHINERY AND CHEMICAL CORPORATION**

*Canning Machinery Division*

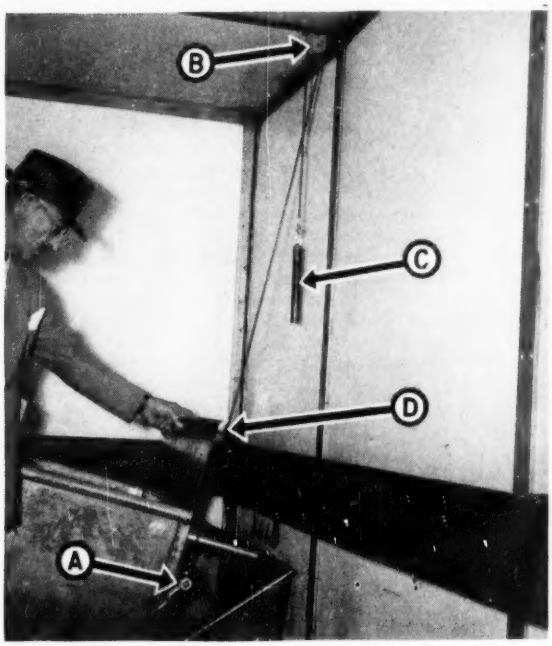
**General Sales Offices:**

**WESTERN:** SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

## Rules For Safe Conveyor Operation

Ten suggestions for operation of conveyors were presented at the 40th National Safety Congress and Exposition. Here they are:

1. Never put a conveyor system into operation until formally turned over by the manufacturer.
2. Be sure drive machinery is guarded.
3. Keep lubrication piped to safe points.
4. Provide adequate clearances for maximum loads.
5. Consider visibility in locating controls and in loading.
6. Confine operation of conveyors to authorized employees.
7. Leave repair to maintenance employees.
8. Provide a smooth cover under slat conveyors to avoid shearing.
9. Insist on no riding and no stepping on conveyors.
10. Instruct employees in loading—considering clearances, visibility, protruding hazards and danger of tumbling.




## Safety Device Prevents Crank Loss

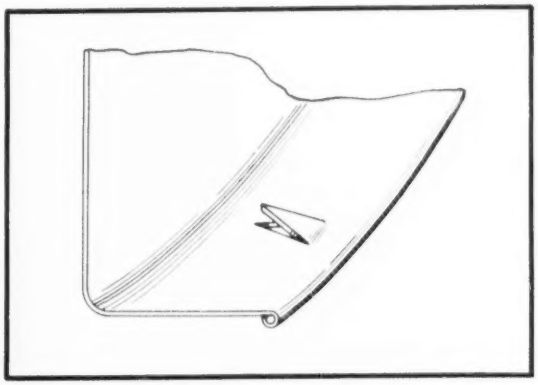
Chance of losing a dough-trough crank at our plant, or possibility of the serious hazard that the crank might fall into the discharge dough and be fed to the cutter (dough divider) was avoided when we added a simple safety device.

Crank in question is used to rotate a geared shaft opening the gate at the end of a mobile trough, permitting dough to flow from tilted vessel into a chute feeding a cutting machine. Should crank become disengaged, fall with the dough and reach the cutter, costly damage to both machine and product results.

To permanently attach crank to the gate shaft was not feasible since space required for each battery of troughs would be increased. Then too, trough mobility would be impaired and a potential accident hazard introduced by cranks protruding from trough sides.

In this way the detachable crank is prevented from ever falling into the cutter feed. First, to the crank—(A) in photo—a metal loop was welded to which a chain was attached. By passing chain over a pulley (B) fastened to the ceiling with a counter weight attached (C), chain is kept taut and out of the way.

Whenever crank is removed from shaft and released, counterweight elevates it to above-head height. A stop (D) attached to the chain, prevents crank from ascending above easy reach. There is now no danger that crank will be lost or fall into cutter feed.—*Samuel Rubin, Vice President and General Mgr., Henry S. Levy & Son, Inc., Brooklyn.*



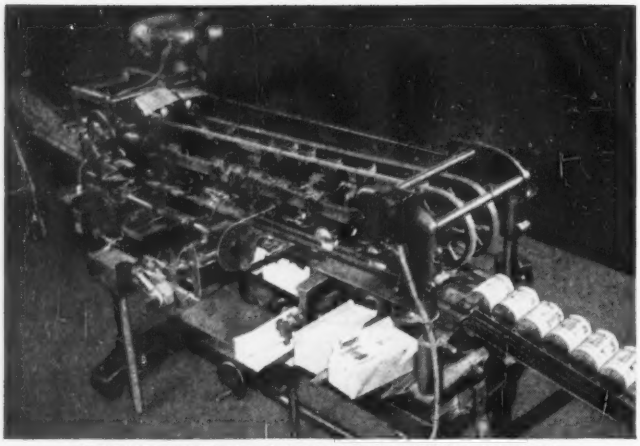
## Lids Secured by Barb Perforations

Merely punching fish-hook-like barbs in the side or lip of metal covers for ½ gal. paper-board ice cream canisters, prevents lids from working loose or slipping off.

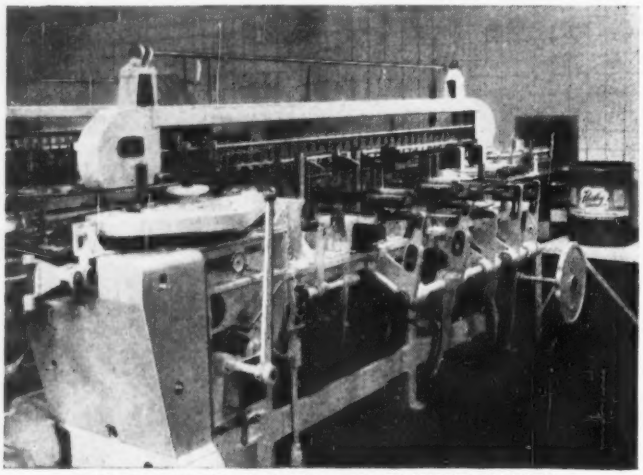
Often the contents of this economy size container (see photo) for take home ice cream, is not consumed at one serving, the remainder returned to the home refrigerator for future use. Too frequently, housewives stored the package on its side, allowing any soft portion to ooze out, often pushing the cover with it when the lid was not securely attached.

Many experimental attempts were made to devise a means of anchoring the lid to the canister so securely that it could not unseat itself, yet not so tightly that it would require unreasonable effort on the part of the housewife to remove it.

The method that proved most satisfactory was hand-punching the sides of the cover (see sketch) to form four barbs on the inside (barbs point toward the top). Results were so satisfactory that the manufacturer of the covers adopted the idea, machine punching the barbs as the



LABELING CANS ON STANDARD KNAPP LABELING MACHINE



LABELING JARS ON PNEUMATIC SCALE LABELING MACHINE

# Free

## CONSULTING SERVICE ON LABELING ADHESIVES

*There's a laboratory-developed, tested and controlled PAISLEY scientifically designed Adhesive for every fabricating, manufacturing, product labeling and sealing operation. Buy your Adhesives the scientific way. Send for an Adhesive Operation Data Sheet. Fill in and return it to our laboratory for analysis and recommendations. Get the ONE best Adhesive for the SPECIFIC operation.* Also send for new Bottle Labeling Technical Service Bulletin No. 21. *Write today. There's no obligation.*

# YOUR OPERATION DETERMINES THE FORMULA

## WHEN YOU USE . .

WHATEVER your adhesive operation "Put it up to Paisley!" Regardless of (1) the type or speed of machine or hand operation; (2) kind of materials to be bonded; (3) type of container surface to be sealed or labeled, or other consideration; you can depend upon our laboratories to develop the *one best* Adhesive for the job. Determining the formula and maintaining absolute quality controls in each succeeding shipment, will not cost you one penny more. We invite you to use this *free* Paisley Scientific Adhesive Service. Just send for our Adhesive Operation Data Sheet. It's a very convenient form which you fill in and return. Upon receipt, our skilled adhesive engineers will quickly study your problem and make specific recommendations. If you want *better results* in your gluing or packaging operations, don't wait . . write for your Data Sheet TODAY!

Paisley SCIENTIFIC ADHESIVE SERVICE

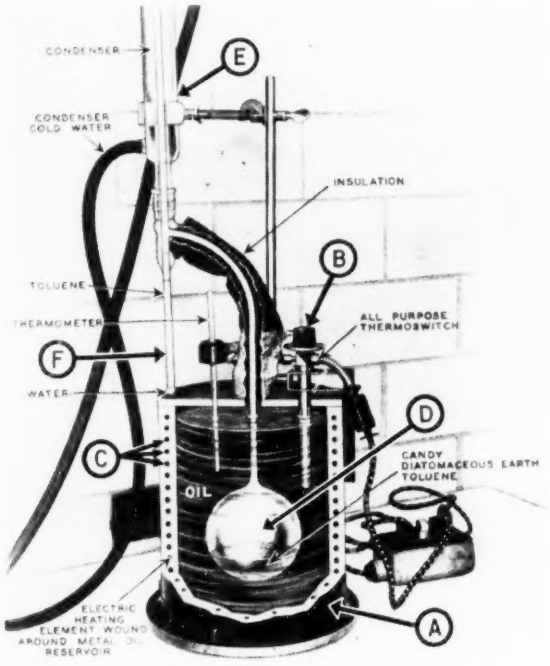
# PAISLEY PRODUCTS INCORPORATED

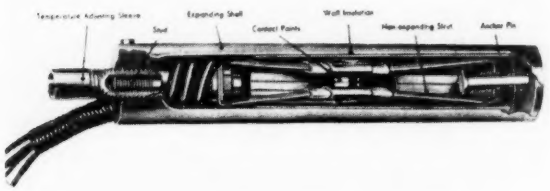
1770 CANALPORT AVENUE, CHICAGO 16, ILL. PHONE CANAL 2219
630 WEST 51st STREET, NEW YORK 19, N.Y. PHONE COLUMBUS 5-2860

*Manufacturers of Glues · Pastes · Resin Adhesives · Cements and related Chemical Products*

covers are fabricated at the can manufacturing plant.

So now, lids slip on easily, yet they stay tight since the barbs bite into the fiberboard of the container.—*Wm. E. Reichert, Industrial Engineering Dept., Abbotts Dairies, Inc., Philadelphia.*




## Accurate Moisture Determination Unit

With readily obtained apparatus, including an electrically heated oil bath, Leebig condenser, measuring tube and precision thermostat, Life Savers Corp., Port Chester, N. Y. has constructed a dependable laboratory device for accurate moisture determination.

This is how the unit is assembled and how determinations are made.

Assembly includes a cylindrical oil bath—(A) in top sketch—maintained at exact temperature by a Thermoswitch (B), which controls current to a 600-watt tubular heater (C), distilling flask (D), condenser (E) and graduated measuring tube (F).

A determination at Life Savers is made by placing in the distilling flask a weighed sample of hard-candy mixed with toluol and diatomateous earth. After flask is submerged in the oil bath and condenser attached by ground glass joint, oil bath is raised to 250 deg. F. and maintained at this temperature for 90 min., by thermoswitch control.

Condensed mixture of toluol and water collects in graduated measuring tube (F), where the volume of water is obtained by direct reading and readily converted to percent moisture in sample.

Adjustable knob on thermostat (B) permits control of bath through a range of temperatures. Construction of thermostat permits accurate control at set-point. Temperature changes cause the outer shell (see lower sketch) and low-expansion struts to expand or contract at different rates, thus causing switch contacts to actuate at set-point temperature. Rigid mounting of struts allows both sensitive response and resistance to shock and vibration.—*FE Staff.*

## Device Catches Unretorted Crates

In fast moving cannery cook-room operations it's not impossible for a whole crateload of cans to move from the sealer to the cooling canal without actually getting into the retort for its necessary cook. When this happens the subsequent damage losses due to the uncooked batch—if it's not caught by a check system—can sometimes be more sizeable than the profit value that has been built up by a good full day's pack.

To forestall this calamity a blue paint has been developed which turns white in 10 to 13 min. at 245 deg. F. or above. Source of this paint at our cannery is the National Can Company.

In our cook room set-up all uncooked, filled crates are rolled under a central hoist which can then deposit the crate selectively in a ring of retorts on a surrounding elevated platform. Adjacent to the man operating this hoist is a bucket of the special paint, and this is dabbed on a few cans at the top of the basket before it is lifted for retorting.

Operators at the cooling canal, also at the labeler are alerted to the blue signal and will reroute any crate that may have bypassed retorting. Since installing the system, we have not had any recurrence of this trouble that plagued us a few times during the previous season.—*Tom Kraimik, Plant Superintendent, Mammoth Springs Canning Co., Oakfield, Wis.*

## Cure For Scorched Bread Loaves

Simple method for removing excess heat from conveyors in continuous ovens—having accumulated during interruption in production—has been devised by Weston's Bakery, Edmonton, Alberta. Thus, scorching of first loaves of bread that pass through oven after an idle interval is

**Huron field men and**

**technical service organization**

**are Best Qualified to help you**

# *add more selling flavor*

**to your food products!**

The use of Huron MSG in meat products and processed foods is increasing by leaps and bounds these last few years. The obvious reason for such rapid increase in the use of Huron MSG is recognition that it improves flavor appeal—sales appeal—DOES boost sales!

If there is any question in your mind on what Huron MSG can do for your food product—or about methods of use—simply drop a line to our Technical Service Department—or phone us. Working from conveniently located centers from coast to coast, Huron personnel is always alert to help to bring out more of the natural flavors in processed foods.

*For FREE trial samples of Huron MSG or Huron HVP—and technical advice on use—simply write or phone—*

**THE HURON MILLING COMPANY • 9 PARK PLACE, N. Y. C. 7**

***Factories: Harbor Beach, Michigan***

**Sales Offices: 161 E. Grand Ave., Chicago 1 • 383 Brannon St., San Francisco 7 • 13 E. Eighth St., Cincinnati 2**

avoided. First trial for removal of excess heat was with water-filled pans. These were moved through ovens after an interim in operation to permit change in product variety or adjustment of oven mechanism.

Though these units absorbed accumulated heat, the scalding contents of the pans at the oven exit made accident hazard too great. Not only was there danger of spillage and wet floors but also of injury to workers.

Investigated next were pans filled with water-soaked asbestos. Since pans' contents soon became black and slimy, this method was discarded.

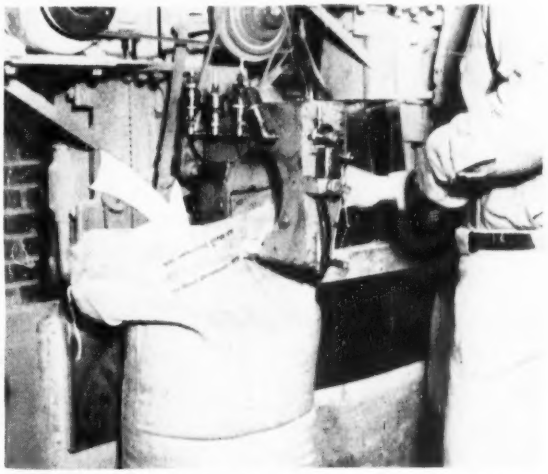
Finally, Vermiculite, an insulating material derived from mica and mined by Zonomite Co., Chicago, was filled into pans and soaked with water. Though this material absorbs heat effectively, it retains most of the water and does not become discolored.

And loaves of bread following these heat absorbing pans through the oven are not scorched or burned.

## Novel Method of Labeling

Correct identification of the contents of thousands of identical bags containing many feeds of varied formulae, was a problem until we developed an economical method of attaching to each a durable card on which is printed the name of the product and a list of ingredients.

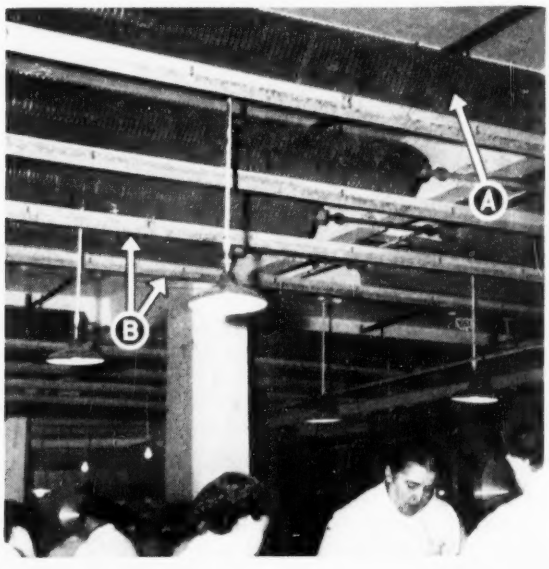
Printing identification of the feed on the bag is impractical since bags are returned, washed, sterilized and reused. Loss of tag-type label is too likely when attached to bag by string or wire. Pasting product identification to a textile bag is equally unsatisfactory.



No labeling problems plague us, and no extra labor is required for the method we now use.

Type of feed, brand name, list of ingredients and analysis are printed on heavy kraft board, lightly waxed on both sides. This tough label is attached at the bag closing station, where it is stitched to bag (right photo) during the closing operation.

Now, label is readily seen and read, but not easily torn or damaged. Neither is it easily detached except when chain stitching is removed to open the bag.—*F. A. Wenske, Assistant Superintendent, Plant Maintenance, Eastern States Farmers Exchange, Buffalo.*




## Simple Temperature-Humidity Control

Until we installed our present system of cooling our skinless frankfurter department, temperature and humidity fluctuated. Result was discomfort among workers and interruptions in production. Maintenance of quality standards was also impaired.

Formerly, the room was cooled by blasts of blower-driven air across refrigerated coils. Temperature varied between 40 and 60 deg. F.; humidity ranged between 50 percent and saturation. No matter how currents of cold air were directed from coolers, workers complained of drafts and uncomfortable coldness.

Finally, air-blast coolers were replaced by fin coils—(A) in photo—equipped with automatic defrosting devices. These assemblies were suspended from the ceiling over the work-space area.

Now, movement of cold air is by gravity, therefore draftless. Any moisture formed on fins drains into small troughs (B), thence to sewer. Workers are more comfortable in a constant 50 deg. F. temperature at an unvarying 85 percent R.H. Production is up and quality standards can be now maintained.—*F. De Vaux, Chief Engineer, and W. Jackson, Assistant Chief Engineer, John J. Felin & Co., Phila.*

# To beat rising taxes, labor and material costs, and competition

## A NEW *Oakes continuous* Mixer-

Everyone with marshmallows to mix knows that in the past five years conventional mixers have been almost wholly replaced in new installations by the Oakes Continuous Automatic Mixer—entirely new in its concept and operation. There are now upwards of 200 installations in leading plants in the United States, Canada, England, Europe, and South America.

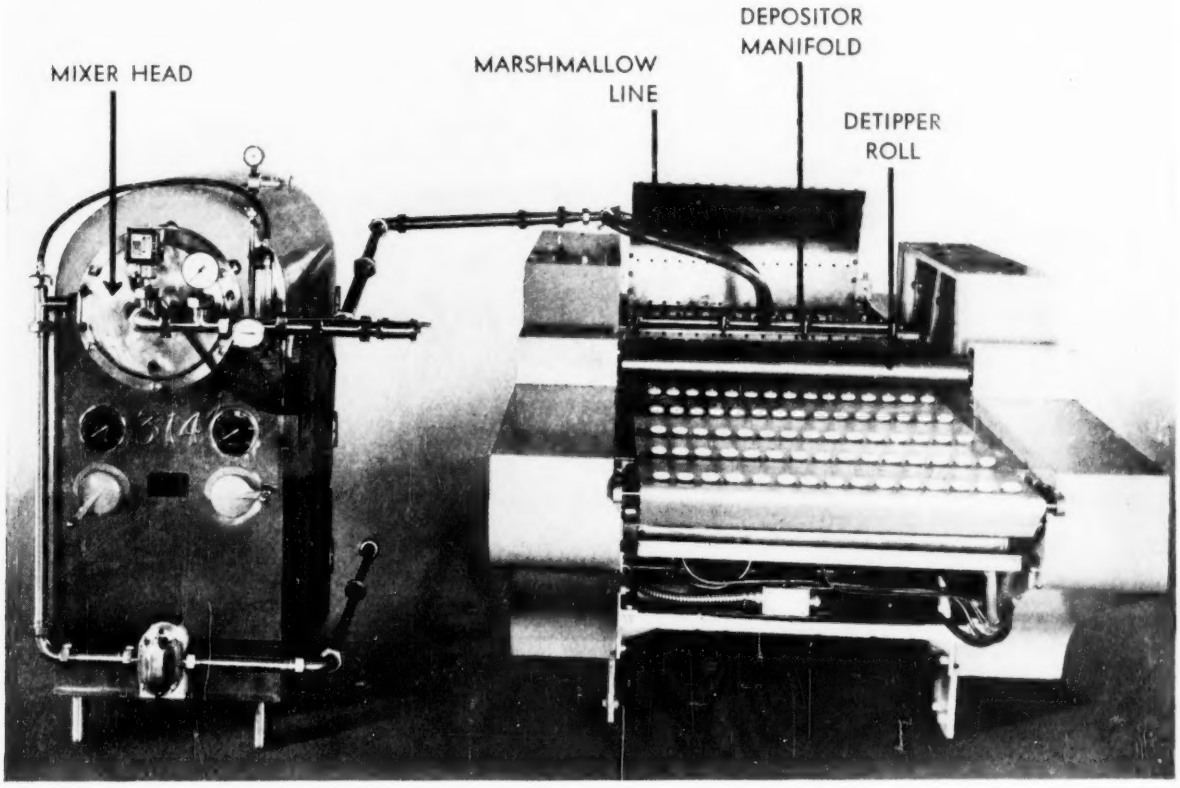
The same originality and imagination have now produced an Oakes Continuous Depositor, which linked with the Oakes Continuous Mixer yields results which will be equally exciting to cost-conscious executives.

The mixer delivers a continuous flow of marshmallow of uniform, superior quality directly into the depositor. There is no tank, trough, or hopper as in conventional depositors. The depositor can run up to 200 depositing strokes per minute with as many as 20 cookies across the apron and a capacity up to 4,000 cookies per minute depending on the size of the cookies and the width of the depositor, which can be 34, 42, or 48 inches. No skinning table is required because the deposited goods can go directly from the depositor to the enrober. Also the same machine will produce sandwich goods in similar capacity.

The quality of the goods is exceptional and highly uniform in contrast to the batch method. Weight losses are cut down sharply. Rejects or "cripples" are reduced by as much as 90 percent. The system is 100 percent sanitary because it is completely enclosed; the depositing head holds only about one pound of marshmallow, can be lifted out with one hand, and cleaned in a few minutes.

Up to four colors of marshmallow can be deposited in conventional shapes and sizes across the apron for variety packs. Different types of jelly also may be


For more information, use coupon on last page.




*More than twice speed of production; cuts out skinning tunnels and sandwich machines!*

# Depositor

deposited at the same time either before or after the marshmallow. Each nozzle has its own individiual volume control so that the desired weights may be deposited across the apron.

The overall performance of this new Oakes mixer-depositor team can best be summed up by this impressive fact—one mixer-depositor installation will do as much work, of better quality, as two conventional depositors, two skinning tunnels, and two sandwich machines, with savings in space, and capital tied up in equipment, and a corresponding reduction of personnel required to operate such equipment.

Your inquiry for full details, and discussion of the possibilities in your plant will be welcomed.

## Here's your mixer too!

Conventional mixers are being replaced today by Oakes Continuous Mixers for almost every type of food product—biscuit marshmallow (up to 1200 pounds per hour); grain marshmallow, white cast marshmallow candy; angel food, pound, layer, and sponge cakes, vanilla wafers, nougat, mayonnaise, salad dressing, whipped butter, egg whites for drying.

Have us direct you to any of the many convenient installations throughout the country where you can make your own discoveries. If you are in the market for mixers be sure to investigate the Oakes Continuous Automatic Mixer.

*Available only through the*

## E. T. OAKES CORPORATION

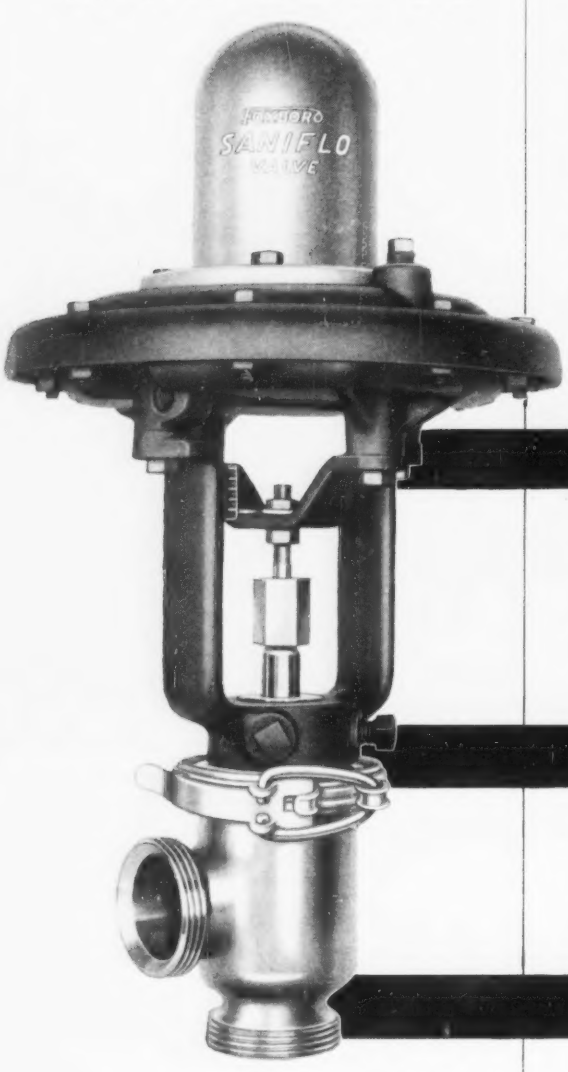
**COMMACK ROAD • ISLIP, LONG ISLAND, N. Y.**



For more information, use coupon on last page.

*all new*

# "SANIFLO" CONTROL VALVE SPECIFICALLY DESIGNED FOR YOU!




## IT'S SANITARY . . .

This new Foxboro 2-way sanitary control valve has been engineered expressly for juice heaters, pasteurizers, milk lines, deaerators, fillers, and other food processing equipment. Its one-piece stem and plunger eliminates threads and crevices which are apt to harbor bacteria. All parts exposed to products are corrosion-resistant Type 18-8 Stainless Steel.

## IT'S EASY TO CLEAN . . .

Operator simply snaps quick-disconnect clamp to take the valve apart, and loosens a hand nut to remove plunger stem. No gaskets or stuffing box to complicate cleaning. Neoprene "O"-ring Seals assure leak-proof connections between body, bonnet, and stem.

## IT HAS HIGH FLOW CAPACITY . . .

Expanded, streamlined body construction allows greater flow of product . . . even viscous substances like processed cheese, chocolate liquor, and cream-style corn flow freely and easily through the Saniflo Valve. Equally effective for throttling (proportional) or open-and-shut control. Standard line sizes, 1" to 3", are available.

*Once you see it, you'll agree that Foxboro's Saniflo Control Valve was designed with YOU in mind. Learn all about it. Write,* The Foxboro Company, 301 Neponset Avenue, Foxboro, Mass., U.S.A.

*See it at the Canning Show — Booth 34*

**FOXBORO**
REG. U. S. PAT. OFF.

**INSTRUMENTS that Improve Product Quality**

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

# FRUEHAUF'S 500

## GIVE YOU CUSTOM-FITTED BODIES AS LOW AS $665.00*

YES—a choice of more than *500* standard truck body options, and many more specials. Precision engineered and ready for *immediate assembly* at your nearest Fruehauf Branch—to your *exact* specifications. You get custom-fitted truck bodies at production-line prices, because they're *"Unit-Built"!*

**ASK** for Fruehauf's free Model Make-Up Kit. It's easy to assemble your own scale model in a jiffy before choosing the body you want.

**12 ft., straight frame, open rear end, taxes extra.*

**FRUEHAUF**
"UNIT-BUILT"
Truck Bodies

***UNIT-BUILT*** **FOR IMMEDIATE ASSEMBLY AT YOUR FRUEHAUF BRANCH!**
***VALUE-BUILT*** **FOR BIGGER PAYLOADS, LOW UPKEEP, LONGER LIFE!**

### The Choices You Get in *Fruehauf's 500*

- ★ Straight or wheelhousing all-steel frames
- ★ All popular body lengths of each type
- ★ Closed or open top and back
- ★ All standard and special door locations and sizes
- ★ Complete variety of tailgates and steps

### Plus These *Added* Fruehauf Advantages

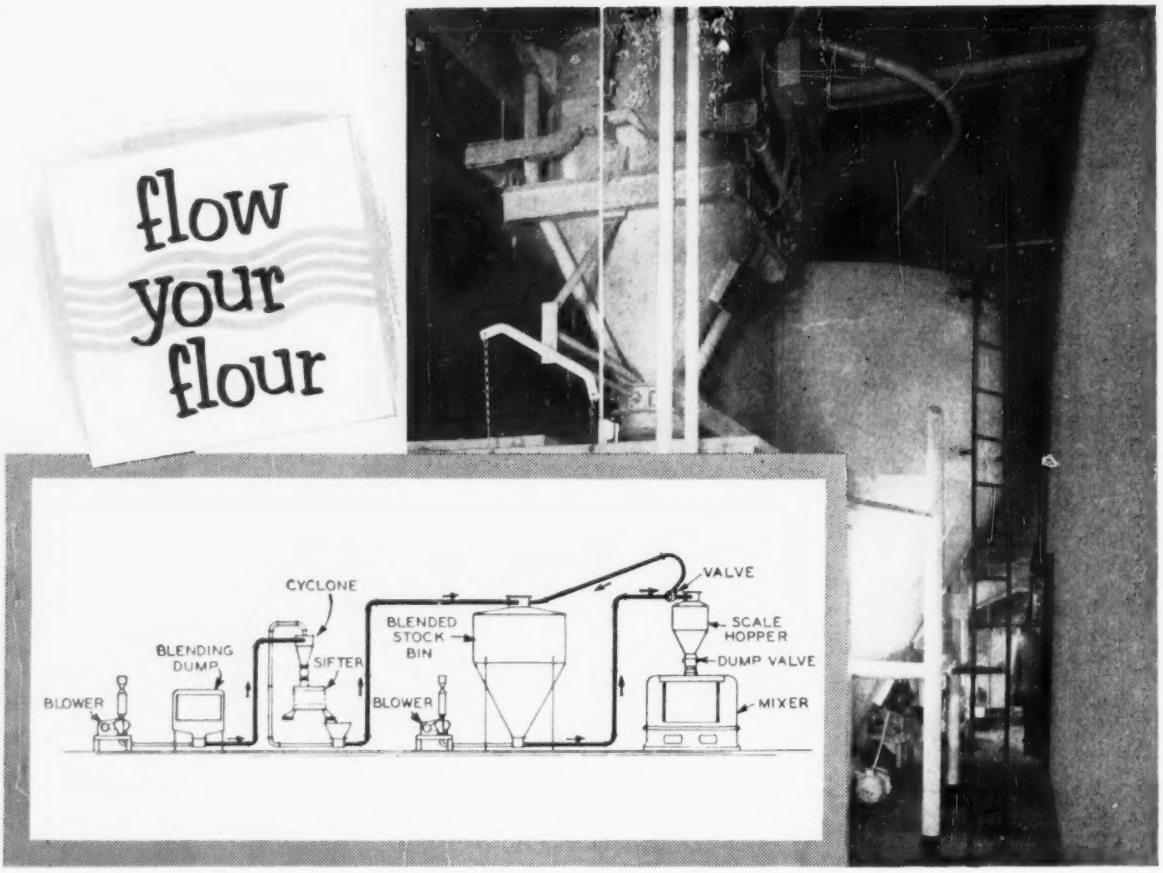
- ★ All-steel roof with coin-pressed seams
- ★ Welded, light-weight, flush-swinging doors
- ★ Fast, inexpensive repairs on these stock assemblies
- ★ Over 80 convenient Factory Branches coast to coast!

*Truck Body Division*
**FRUEHAUF TRAILER COMPANY**
**Detroit 32, Michigan**



For more information, use coupon on last page.

# flow your flour




## ...around corners–through pipes with The AIRVEYOR®

Fast transport of flour through sealed pipes with the Fuller Airveyor has two great advantages:

1. Contamination and spillage are gone.
2. Pipes can be run anywhere in your plant.

Not only white flour—but also rye, graham, cracked and whole wheat are handled rapidly, at less cost all the way from dumping point to mixers.

Self-cleaning pipes cancel hazards of dust explosion, cut wastage down to zero. Sanitary standards are improved and automatically maintained.

Handling materials with AIR is by far the cheapest way as many leading bakers will say. It will pay you to take a minute right now to get all the facts on Fuller air systems for bakeries. Write now for complete information.

**Fuller**

**CONVEYS BY AIR**

**...NOTHING MOVES BUT THE MATERIAL**

*Conforms to "Sanitary Standards for Flour Handling Equipment."*

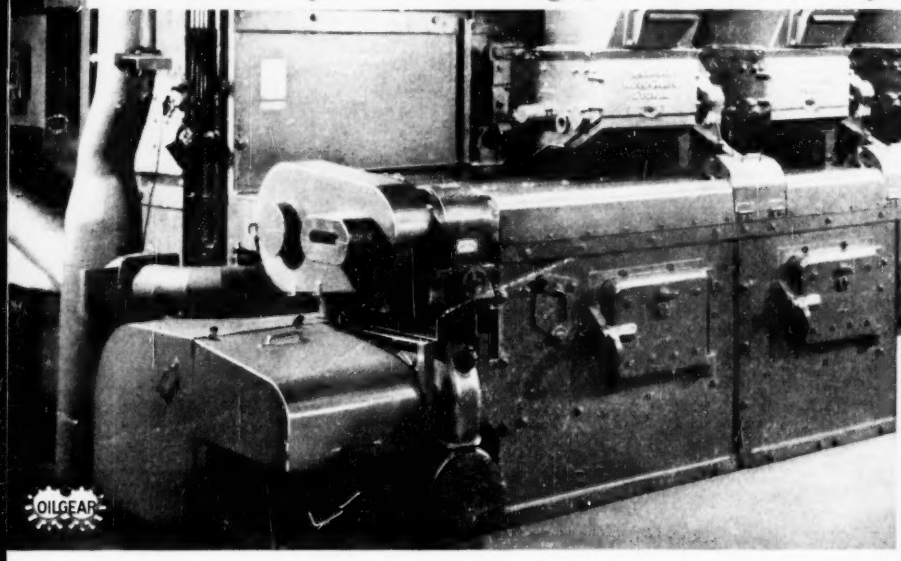
**FULLER COMPANY**
**Catasauqua, Penna.**

A-156
1808

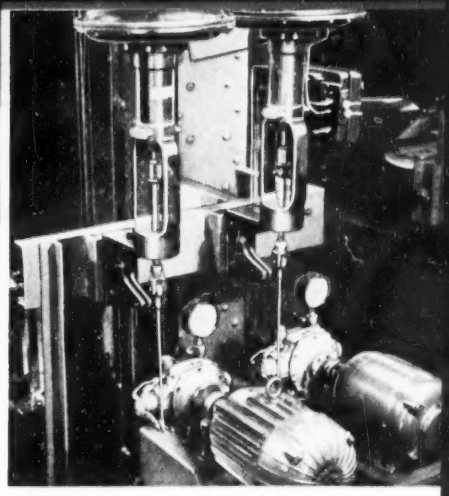
**THE FRED D. PFENING COMPANY**
**Columbus 8, Ohio**
**Distributor to the baking industry in the U. S. and Canada**

Fuller Company is the exclusive manufacturer of air gravity conveyors, except for use in motor vehicles, under Huron Portland Cement Company, U. S. Patent Nos. 2,316,814: 2,517,837: 2,527,394: 2,527,455: 2,527,466: 2,527,488: 2,589,968 and Patents Pending.

"ONE OF THE *Highest Efficiency Units* "IN THE UNITED STATES



View in J. I. Case Co. tractor works at Racine, Wis. Boiler front and Detroit Roto-Grate Stoker on 100,000 lb. per hr. boiler unit.



# And Oilgear's Range and Control help capture savings hidden in J. I. Case 100,000 lb. Boiler Unit

The 100,000 lb. per hour boiler unit in the J. I. Case Co. tractor works at Racine, Wisconsin, has demonstrated that it is one of the highest efficiency units in the United States. To obtain such high efficiency, careful tests of variable speed drives for fuel feed and grate travel were made during two years. Finally, Case engineers selected Oilgear Fluid Power Drives, for, as Mr. Cole H. Morrow, Chief Plant Engineer says, the Oilgear units proved far superior to electric drives and mechanical transmissions under actual operating conditions.

**SMOOTH, POSITIVE SPEED VARIATION** "In order to obtain high efficiency in any boiler unit," says Mr. Morrow, "*a very precise variable speed fuel feed drive* is required to meet widely varying demand. The Oilgear Drive gives smooth, positive variable speed operation from zero to 100% of capacity with a straight line fuel feed characteristic. This allows us to calibrate the control system for operation within amazingly close limits of fuel-air ratio variation.

**EASE OF CONTROL** "Also, on this type of stoker the grate speed must be infinitely variable from minimum to maximum yet maintained in direct proportion to the rate of fuel feed. Every change in fuel feed requires an immediate and directly proportionate change in grate speed. (Such synchronization) is easily obtained with the Oilgear drive units because of their ease of control, and the simplicity and low force requirements of the control mechanism."

**UNLIMITED SPEED RANGE** Also, fuel feed and grate drives must have a range of speed at least equal to the demand range. Most drives have a range not exceeding 4 to one. Yet at Racine, during the summer, demand drops far below the 25,000 lb. threshold imposed by such a ratio. The Oilgear Drives however have no "ratio" limits, would function down to zero load if necessary. In fact, they give precise load control down to a load of 15,000 pounds per hour normally obtained each day during the summer, and down to as low as 5,000 pph over the weekends still under full automatic control.

**OUTSTANDING RELIABILITY** "One of the outstanding features we discovered . . . was the *reliability of the Oilgear units*. The experimental installation operated almost continuously for a year and a half without any difficulty. This record was far better than we were able to obtain with any other type of drive or transmission."

These four features, variability, ease of synchronization and control, actual range from zero fpm, rpm or torque up to maximum, and reliability proven over and over again, are indications of the many advantages Oilgear drives and transmissions offer in machine design and use. Investigate Oilgear equipment as a *better* solution for your problems. THE OILGEAR COMPANY, 1580 West Pierce Street, Milwaukee 4, Wisconsin.

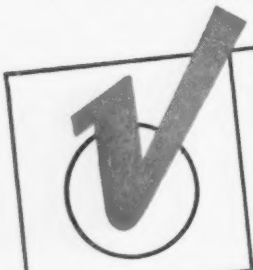
**Two Oilgear Variable Delivery Pumps with simple diaphragm actuated hydraulic servomotor lever controls supply fluid power for the fuel feed and grate drives. An Oilgear drive was experimentally installed on the fuel feed on the first stoker in 1948. On the basis of its performance, Oilgear drives were used for *both* fuel feed and traveling grate on a second stoker unit installed in 1949. Also, Oilgear will replace the mechanical grate drive on the first stoker installed in 1943. Like a shadow, flexible, controllable Oilgear *Fluid* Power causes fuel feed rate and grate speed to accompany steam demand up and down. Recording charts show steam *demand* varies "all over the place," but steam pressure and fuel air ratio stay steady.**

Oilgear

**PIONEERS IN FLUID POWER**

**PUMPS, TRANSMISSIONS, CYLINDERS AND VALVES**

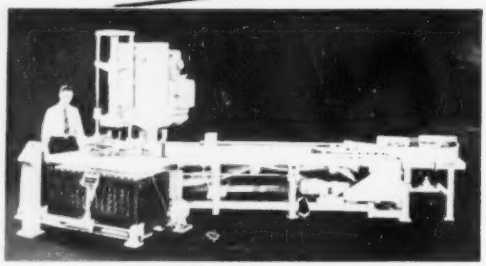
## When looking for lower cost in Food Packing...



**CHECK WITH BARNES**

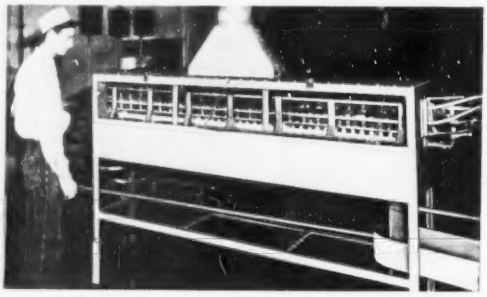
The products and installations we have made for the food industry are many and varied. However, each has one important feature in common . . . it has helped a food packer do a better job at less cost. These products and installations have resulted from our work in collaboration with food packers on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.

### Over 500 Cans Unloaded per Minute

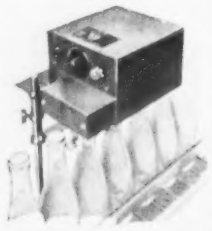


This unloader accommodates both rectangular and round cans. It is provided with a special rotary can unscrambler and a long conveyor to accommodate hand casing of cans containing whole hams. It unloads up to 600 cans per minute depending upon size and shape of cans.

### Production Jar Washer



This is one of our newest items for the glass packer. Jars, prior to entering the washer, are inverted and enter the washer with open end down. A fine spray of hot water under high pressure is applied to both inside and outside of jars as they pass through the enclosed washer.



### Electronic Detector

This efficient unit detects missing closures. It has full automatic operation, is single, fast and dependable. It has a wide range of application, prevents loss of product and minimizes line down time.

**Other BARNES Processing Equipment**

Automatic Retort Basket Loaders and Unloaders
Packaged Can Unloaders
Glass Handling Machines
Special Conveyors
Tray Loader
Pallet Unloader
Carton Uncaser
Double Seamer

**FREE ADDITIONAL DATA** on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for bulletin FIS

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 328 SOUTH WATER STREET, ROCKFORD, ILLINOIS


(ADVERTISEMENT)

## City Health Department Investigates Martin Aseptic Canning of Fresh Whole Milk

The population of Rockford, Illinois is approximately 100,000. The daily consumption of whole milk approximates 57,000 quarts. Recently, the Rockford City health department made a local sanitary field study of the Martin Method of Aseptically canning milk and milk products. This was done in anticipation of the possibility of one or more Martin Aseptic canning units being installed in the Rockford Metropolitan area.

## Find Finished Product of "Good Flavor, Color, Texture, and Good-Keeping Quality"

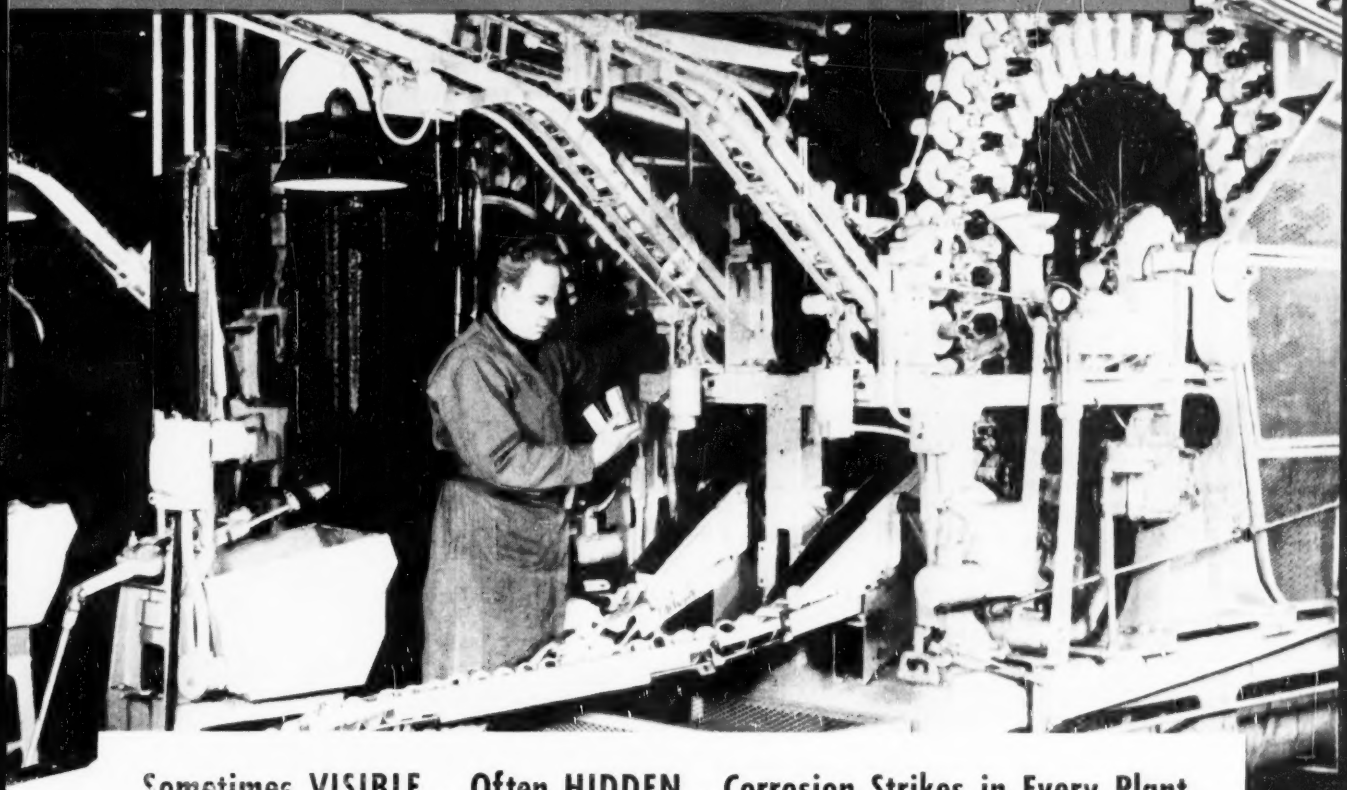
Among the many features found in the summary of the Rockford Health Department Report are those of commercial value as we have stressed in this column previously. From a public health standpoint they report: "Clinical laboratory test results apparently reveal that the Martin Method of Aseptically canning sterilized milk and milk products in sealed containers can meet acceptable public health standards of sanitation."

## Only Two Units Required to Serve City of 100,000

Only two Martin Aseptic canning units would be necessary to handle the daily demand for fresh milk in Rockford. For further information on this interesting system write to W. F. and John Barnes Co., Process Equipment Division, 301 South Water Street, Rockford, Illinois.

IN THE FOOD INDUSTRY

# There's more to CORROSION than meets the eye



## Sometimes VISIBLE...Often HIDDEN...Corrosion Strikes in Every Plant

This year, the Food Industry will pay millions of dollars for needless losses created by corrosion ... *yet much of this corrosion may never be discovered* until it's too late to protect—and time to pay!

Even though rust is seldom visible in well kept, modern plants, corrosion is sure to be present. And, by far, the major costs of corrosion come from hidden areas—where only minute inspections and constant care can prevent costly failures.

### YOU LOSE IN A "WAITING GAME"

Don't wait for rust or other visible signs to appear. Visible or hidden, corrosion will destroy costly equipment ... halt production ... cause unnecessary maintenance shutdowns ... and make plant clean-up more difficult. Thus corrosion dips deep into your profits as it creates needless losses totaling thousands of dollars.

### YOU CAN PREVENT NEEDLESS WASTE

Check your plant for corrosion's presence. Double-check areas that may be vulnerable to *hidden corrosion*. If you would like help, an AMERCOAT Field Engineer will gladly assist you in making a thorough analysis. There is no obligation.

**What is AMERCOAT?**

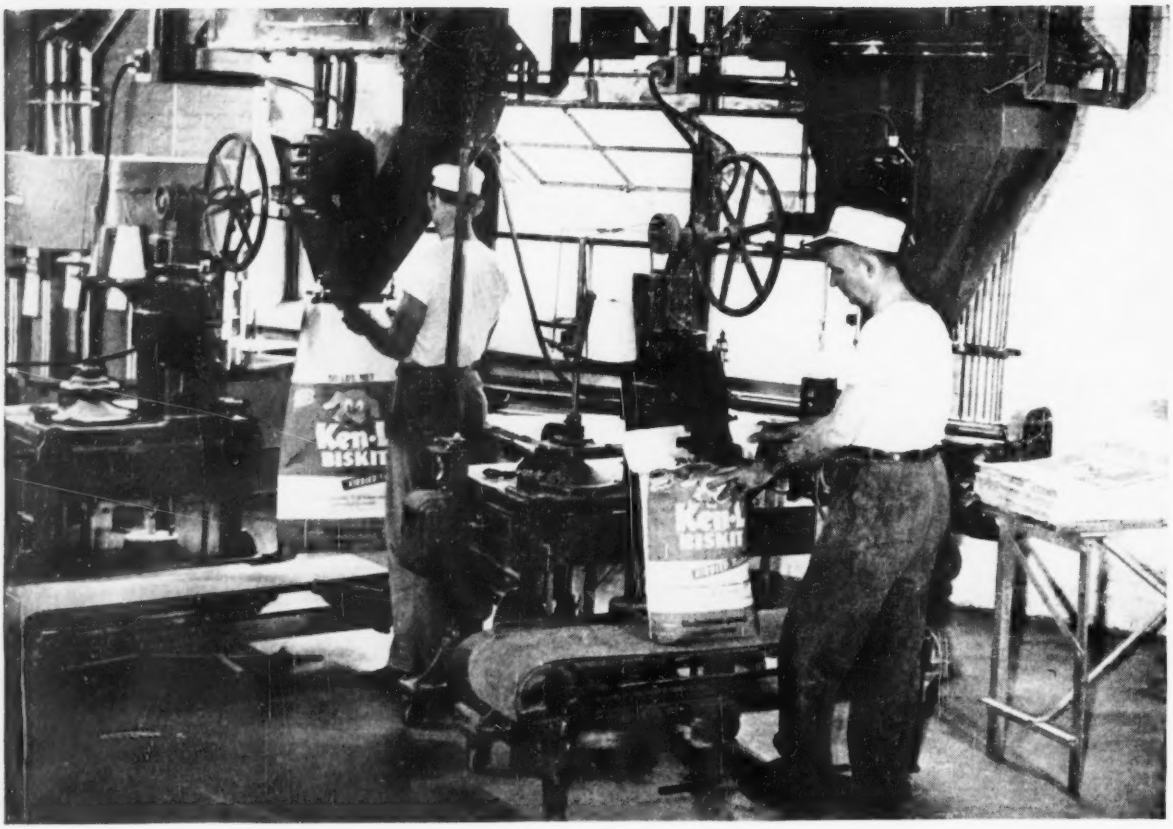
AMERCOAT is a method of corrosion control. Not just a single product, but a complete LINE of coatings, individually formulated to solve or control specific industrial corrosion problems.

FOLLOW THE LINE OF *most* RESISTANCE ... PROTECT WITH *Amercoat!*

**AMERCOAT CORPORATION**

4809 FIRESTONE BLVD., SOUTH GATE, CALIFORNIA

CHICAGO, ILL. NEWARK, N. J. JACKSONVILLE, FLA. DALLAS, TEX.




## RICHARDSON BAGGING EQUIPMENT WORKS FOR QUAKER OATS

**PROBLEM:**

To bag rapidly and efficiently 25- and 50-lb. lots of Ken-L-Biskit. Weight of individual bags to be held to close tolerances.

**SOLUTION:**

Installation of a number of Richardson E-50 Baggers. Speed and dependability were illustrated by the tremendous yearly output that passed through these scales, enough to fill completely a train more than 10 miles long.

In recent years, the nation's canine population has developed a voracious appetite for the well-known dry dog food, Ken-L-Biskit. Production soared and with it the need for a more rapid bagging system. Quaker Oats called in the Richardson Scale Company—specialists in materials-handling-by-weight. They recommended and installed a battery of Richardson E-50 Baggers. Result: A potential bottle-neck was eliminated and Fido was kept happy with plenty of Ken-L-Biskits.

This is just one of many instances where Richardson's 50 years of material-handling-by-weight experience have proved valuable. Experience with materials from seed to feed and coal to chemicals enables Richardson engineers to recommend the best system or combination of systems to solve your particular problem. Remember, Richardson engineers have successfully solved numerous materials-handling-by-weight problems such as yours. A survey of your problem places you under no obligation, and can point the way to more profitable operation.

*For information on Richardson Automatic Weighing Equipment, ask for Bulletin No. 0450. For information on Richardson Proportioning, Blending, and Process Control Equipment, ask for Bulletin No. 0550.*

**Richardson Scale Co., Clifton, New Jersey. Feeder-Weigher Systems of All Types: Automatic Bulk Weighing Hopper Scales, Including Conveyor-Feed Types — Continuous Feeder-Weighers — Automatic Bagging Scales — Bag-Sewing Conveyors — Packers — Process Control Panels. *Branch offices in:* Atlanta · Boston · Buffalo · Chicago · Detroit · Houston · Minneapolis · New York · Omaha · Philadelphia · Pittsburgh · San Francisco · Wichita · Montreal · Toronto.**

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

7872

Here's the hookup for valve-killing corrosive services...

# Stainless Steel

plus

# Jenkins Quality

To end high valve mortality from corrosive liquids, and to control fluids that must be kept free from contamination or discoloration, stainless steel is the right metal. But it takes more than metal to make a valve. For dependable performance, you need the two-way hookup—Stainless Steel *and* Jenkins time-proved Valve Engineering.

With the increased demand for processing equipment that resists corrosion, more and more Stainless Steel Valves have been added to the Jenkins line. It now includes types and sizes to meet most industrial needs.

Look for the famous Diamond trade-mark on valves of stainless steel. As on *any* Jenkins Valve, it means extra years of trouble-free service.

Send for this folder, Form 194, describing the complete line of Jenkins Stainless Steel Valves. It contains specifications and other important data that will help you select the *right* valves for your plant. Jenkins Bros., 100 Park Ave., New York 17, Jenkins Bros., Ltd., Montreal.

JENKINS

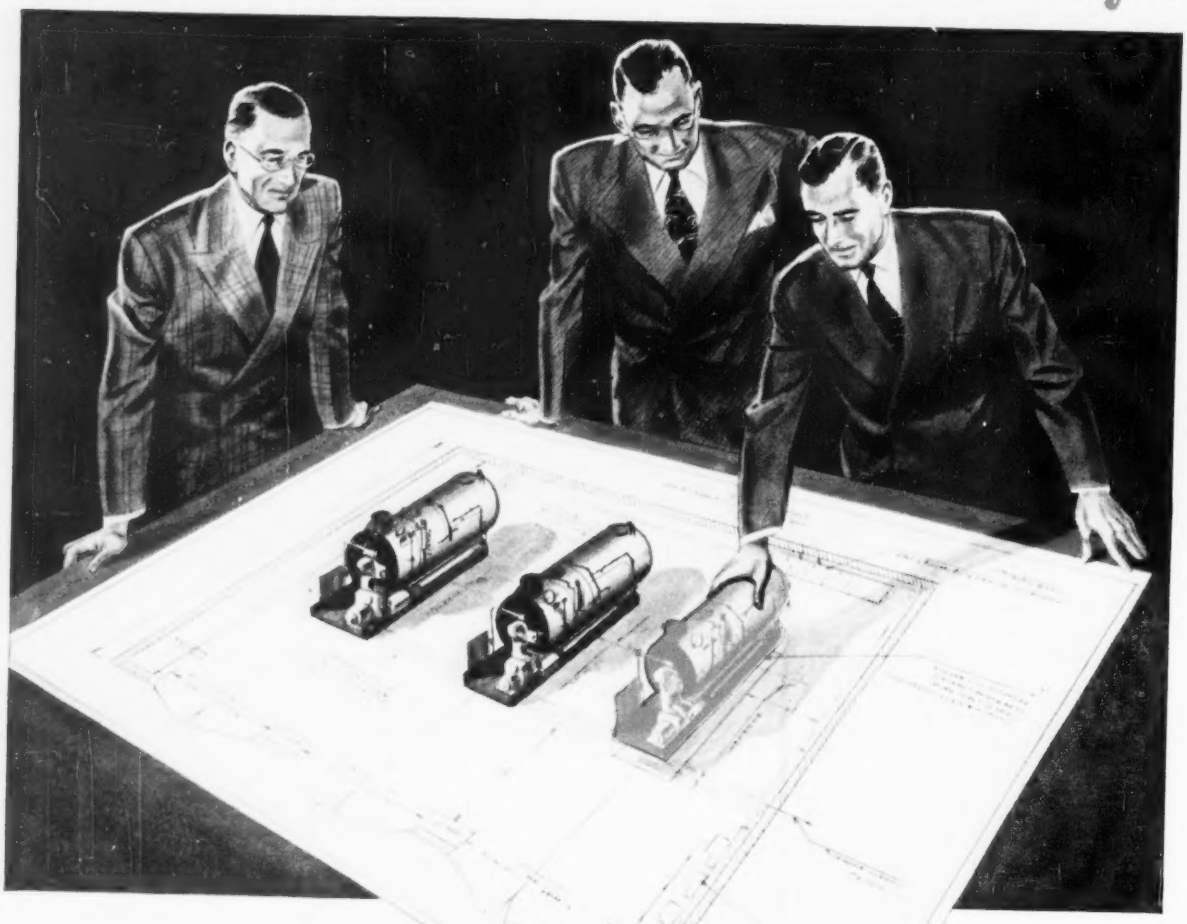
LOOK FOR THE DIAMOND MARK

VALVES

SINCE 1864

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

# Plan Your Boiler Installation this Way..



## ...to Balance Load Factor with Low Investment
## ...to Meet Present Needs and Future Expansion...

CLEAVER-BROOKS self-contained steam boilers are the answer to both present and future steam needs. You can install Cleaver-Brooks boilers in units to fit your present steam capacity requirements . . . keeping your investment at a minimum and your boiler efficiency at a maximum. Here's how it works . . .

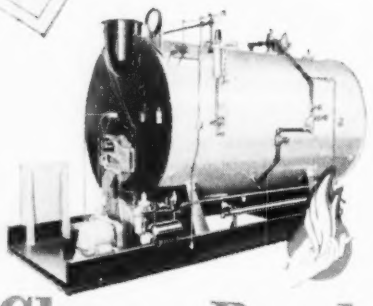
Your initial Cleaver-Brooks boiler installation is made in the size or capacity to fit your present steam load — this assures full use now at top efficiency and low capital investment.

As increased steam needs arise, additional Cleaver-Brooks boilers can be added to keep pace with your expanded requirements.

With this flexible program, you have the greatest return from your boiler investment — minimum original cost and lowest operating cost. Your boilers are always operating at maximum efficiency (80%) over the entire working range (30 to 100%).

Cleaver-Brooks self-contained boilers are ideal for multiple installations because of their compactness, low headroom requirements, fast installation, automatic operation, range of sizes. Available in standard models—15 to 500 hp.; 15 to 250 psi; gas, oil or combination gas and oil fired units.

Get all the story — write today for latest catalog.



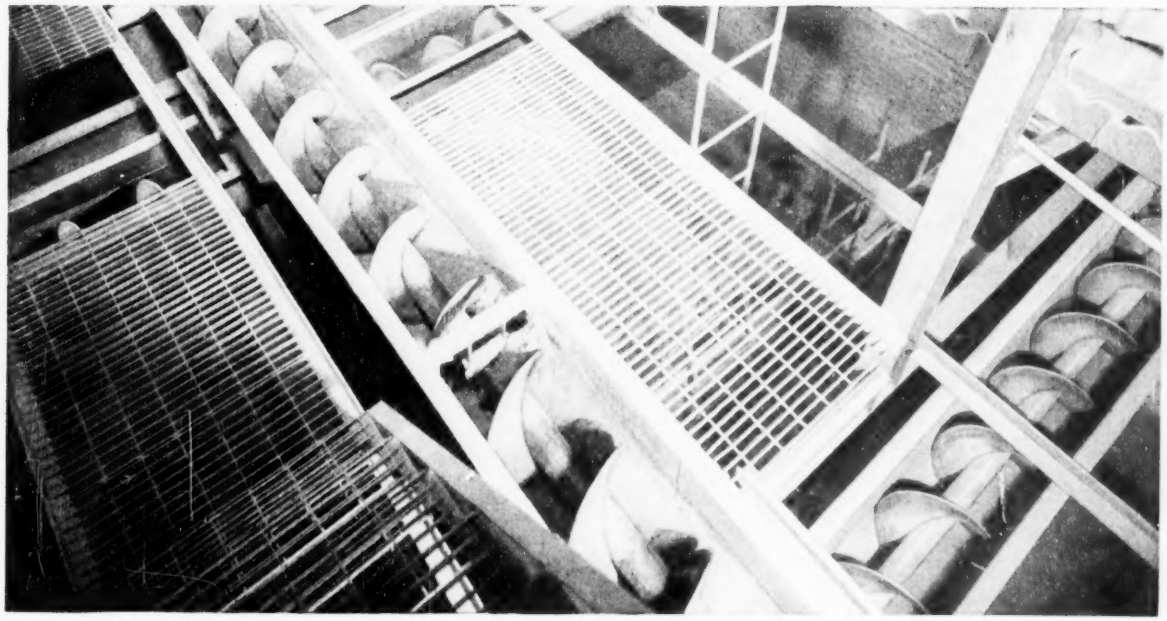
**Cleaver-Brooks**

Dept. 362A E. Keefe Ave., Milwaukee 12, Wis., U.S.A.
Cable Address: Clebro-Milwaukeewis

Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners



For more information, use coupon on last page.



This Link-Belt 12-inch screw conveyor delivers screened mixed material to four 12-inch diameter reversible screw conveyors. These distribute to 16 raw-material storage bins through a series of discharge gates and chutes.

# There's no substitute for "total engineering" in screw conveyors

**LINK-BELT integrates all components to give you the right screw conveyor for your job**

HERE'S how "total engineering" works for you when you buy Link-Belt Screw Conveyors.

First, conveying specialists analyze your problem. Then, Link-Belt's vast experience in design and manufacture is at your command to recommend the screw conveyor—or system of conveyors—for your particular requirements. The right components are then selected from Link-Belt's complete range of types and sizes.

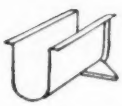
Link-Belt "total engineering" on your screw conveyors is your assurance of efficient design . . . balanced performance.

To benefit from Link-Belt's materials handling experience and engineering service, contact the Link-Belt office near you.

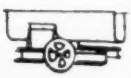
## LINK-BELT designs and builds all components

**SCREWS**—Link-Belt makes a complete range of conveyor screws—Helicoid, Sectional Flight, Cut Flight, Ribbon Flight, Paddle type and other special types for such diverse applications as feeding, conveying, mixing, agitating, stirring, blending, etc.

**HANGERS**—Available in a variety of styles and mountings, with various bearing materials and steel or cast hanger frames.



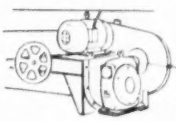
**TROUGHS**—Link-Belt builds flanged, angle flanged, flared, rectangular, dust-seal, jacketed and drop-bottom types in steel or alloy metals. Variety of connections, supports, covers and clamps offers added design flexibility.



**SPOUTS & GATES**—Plain discharge spouts can be fixed or detachable. Discharge gates, flat or curved slide, can be hand or rack-and-pinion operated.

**SHAFTS & COUPLINGS** — Conveyor couplings and end shafts are designed for adequate torsional strength and have jig-drilled coupling bolt holes for accurate alignment.

**TROUGH ENDS**—Steel or alloy metal plate or cast trough ends to match all trough shapes, provide required shaft bearing support and alignment. Seal glands to protect bearings, if required.



**DRIVES** — Link-Belt designs and builds many forms of drives to suit specific conditions—Enclosed gear, Electrofluid, P.I.V. variable speed, and chain drives of various types.

**LINK-BELT**

**SCREW CONVEYORS**

12,884

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities.



For more information, use coupon on last page.

# The story of the

**SERVING INDUSTRY . . . SERVING AMERICA**

You are always close to Continental Can with its 65 plants in the United States, Canada and Cuba, 17 field research laboratories and 63 sales offices.

# magic strawberry "basket"

Place strawberries in this "basket" in June, and they're every bit as red, sweet and juicy in December.

The "basket" that performs this magic is a Continental can.

Frozen strawberries have been on the market for some years. But they've never had a container that offers so many advantages as this enameled, hermetically-sealed can.

The housewife will find that frozen fruits and berries packed in cans retain their rich color because they have been packed in the absence of air. The can is easily and quickly defrosted, and opened with no loss of juice.

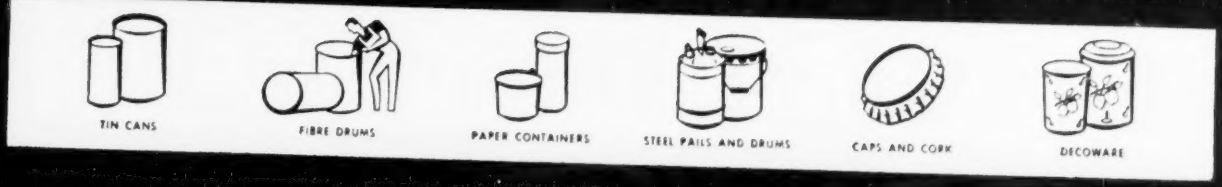
To the packer, Continental cans mean speeded-up filling operations and no leakage problem. They mean better quality-control because the package is sealed under a "steam vacuum." And they often reduce costs because immersion-type freezing can be employed.

These new Continental cans are now being used for packing frozen peaches, berries and cherries as well as strawberries . . . and canned frozen vegetables will be next. There is every reason to believe that the magic "basket" developed by Continental will do as much for the growers of these products as cans for frozen juices have done for the citrus industry.

**CONTINENTAL CAN COMPANY**

CONTINENTAL CAN BUILDING

100 E. 42nd ST., NEW YORK 17, N. Y.



# too few cooks spoil the production

PHILADELPHIA
Instead of 30 minutes per batch, a Philadelphia food processor now requires only 15 minutes.
CALIFORNIA
In California, a preserving company was able to make 2 extra cooks a week because the kettles heated up faster.
BOSTON
From Boston comes a report of kettles requiring only 12 minutes to reach cooking temperature, instead of the former 25 minutes.

What did all these plants have in common? They had switched from old-style steam traps to Yarway Impulse Steam Traps.

Yarway Impulse Traps are designed for more production . . . *to get equipment hotter, sooner and keep it hot.* Additional features include small size, easy installation, low maintenance, low cost, stainless steel construction . . . and Yarway service available from nearby Yarway steam trap engineers.

You can buy Yarways from the nearest of over 200 Industrial Distributors. Over 800,000 Yarway Impulse Traps already have been installed. Write for Bulletin T-1740.

**YARNALL-WARING COMPANY**
**127 Mermaid Avenue, Philadelphia 18, Pa.**

***You can try a Yarway trap for free in your own plant for 60 days. Prove its advantages under your own conditions. Drop us a card.***

YARWAY

the steam trap designed with more production in mind

## Remember how you longed for air conditioning last summer?

You swore you'd never go through another summer without air conditioning. Now—today—is the time to do something about next summer. Here's why:

Your Westinghouse Contractor isn't rushed now. His men can install your new unit faster, better . . . without overtime. He will save you money. And he will do the work when it suits *you*—without disrupting your business.

It will pay to select Westinghouse equipment because:

**Westinghouse costs less to operate.** Its refrigerant-cooled motor saves on electric power and upkeep. Its hermetically-sealed design means less maintenance, fewer service calls.

**Westinghouse gives better performance.** Only Westinghouse designs and builds all components. This means smoother operation and longer life, because all parts have been precision-built to work together.

**Westinghouse has a full equipment line.** Whatever you require, from 2 tons up, a Westinghouse system will match your needs. Only Westinghouse offers so complete an air conditioning line.

Interested? Want to do some advance planning? Then send for the Westinghouse Planning Guides. Or better still, call your local Westinghouse Air Conditioning Contractor for a free estimate. He'll be glad to help you. He's listed in the Yellow Pages of your classified directory.

YOU CAN BE SURE...IF IT'S

# Westinghouse

AIR CONDITIONING

J-80285

Westinghouse Electric Corporation
Air Conditioning Division
181 Damon Street
Hyde Park, Boston 36, Mass.

☐ Send me the "Planning Guide for Industrial Air Conditioning".

☐ I want a free estimate of the cost of air conditioning my premises.

Name.....

Company.....

Address.....

City.....Zone.....State.....



For more information, use coupon on last page.

# The *Speedline* system saves money on stainless piping and increases flow and capacity

You can save money on your corrosion-resistant piping systems . . . perhaps even cut your costs in half. *Speedline* engineers have achieved these amazing results by using the new light wall stainless pipe and versatile *Speedline* Fittings. Here's the way it works:

### *If you are now using Stainless Pipe . . .*

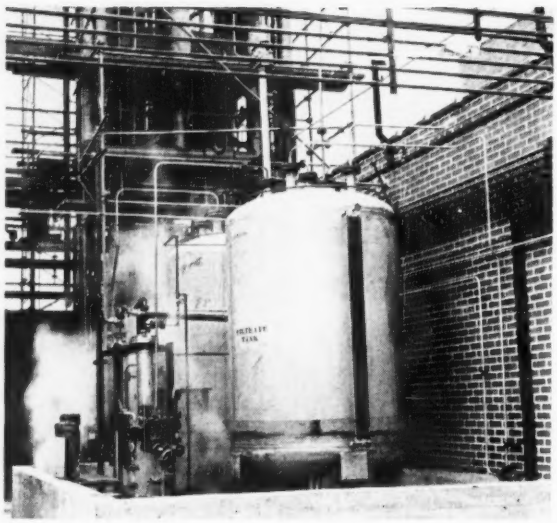
. . . chances are that it is the conventional Schedule 40. But this heavy wall is not needed in 90% of the cases. Light wall Schedule 5 pipe costs about half as much, and all sizes will easily withstand 150 p.s.i. working pressures. *Speedline* Fittings are specially designed for fast, low-cost installation of light wall stainless pipe lines. And because light wall pipe of the same size has a larger inside diameter than heavy pipe, you gain 15% to 25% greater flow and capacity!

### *If you are now using Stainless Tubing . . .*

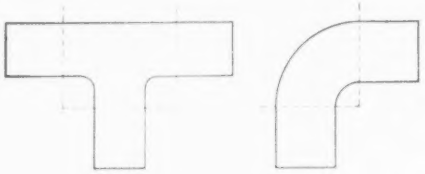
. . . the *Speedline* system offers real savings and advantages. It permits you to change to a light wall *pipe* rather than *tubing* size—at no increase in cost. And here's where you gain. Standard equipment like valves, pumps, sight gauges, etc., are made in *pipe* sizes—you hook right in without special adapters! And equally important, *piping* permits you to use the next lower dimension (for example, 1½" pipe has essentially the same capacity as 2" O.D. tube). This means that you can use smaller valves, flanges, and other accessories—an entire installation would be considerably lower in cost.

***WRITE FOR THIS FREE BOOK***

Just write a note on your company letterhead and we will mail the *Speedline* catalog to you. It shows why you get better results at less cost with *Speedline* Fittings.



Over 800 *Speedline* flanges are used in this installation by one of the largest chemical producers. Shortly after they were installed, a mishap occurred which caused the fluid to solidify in the lines, building up tremendous pressures. When the lines were put back into operation, not a single *Speedline* flange leaked!



### *Look for the "Tangential Feature"*

These drawings show a *Speedline* Tee and 90° Elbow. The dotted lines show the termination points of conventional fittings. The additional straight section of *Speedline* Fittings permits attaching of unions or flanges without fouling, reduces the number of welds required, and eliminates troublesome curved or angle joints. The tangential feature is common to all *Speedline* Fittings such as Ells, Tees, Crosses, etc.

**Speedline distributors are located in principal cities from coast to coast**

**Speedline Corrosion-Resistant FITTINGS**

*—the newest thing in pipeline economy*

*Manufactured by* **HORACE T. POTTS CO.** • Erie Avenue & D Street • Philadelphia 34, Penna.

# It's smart to stick with Swift's Adhesives

*They serve you and the grocer, too!*

In modern, self-servicing merchandising—where eye appeal often makes the sale—Swift's Adhesives serve successful manufacturers in many important ways. For example, they provide a lasting bond for labels on cans, bottles and jars . . . maintain the appearance of paper products . . . keep packages neatly sealed.

**When you need adhesives, always remember—**

- Swift has years of specialized experience in adhesives production.
- Swift works with a broad range of quality raw materials.
- Swift has extensive adhesives manufacturing facilities . . . distribution points from coast to coast.

**Three adhesives for food producers:**

Hot Pick-Up Gum—Swift offers good selection for hot or cold cans or glass. Effective on fast or slow lines.

Lap Pastes—that cut wrinkling, resist the effects of sweating. Economical . . . smooth running.

Case Sealer—the right kind for every use. A wide selection including fast sealing adhesives for cases that are placed immediately in freezers.

*Flotill Products, Inc., Stockton, California, makes good use of Swift's Adhesives. One of the most important applications is the sealing of labels* neatly, attractively *on bottles and cans.*

Call **SWIFT** *first* for **ADHESIVES**

Swift & Company
Adhesive Products Department
Chicago 9, Illinois

*This offer expires Feb. 28, 1953*

Please send your ———lb. introductory trial shipment of

☐ Hot Pick-Up Gum. (Describe can temperature range)
☐ Lap Paste. (Describe type of operation)
☐ Case Sealer. (Describe pressure time)

These products, at the quantity price, will be tested for use in our operations. We understand, if not fully satisfactory, they may be returned for credit at your expense.

*Name* _____ *Title* _____

*Firm Name* _____

*Address* _____

*City* _____ *Zone* _____ *State* _____



For more information, use coupon on last page.

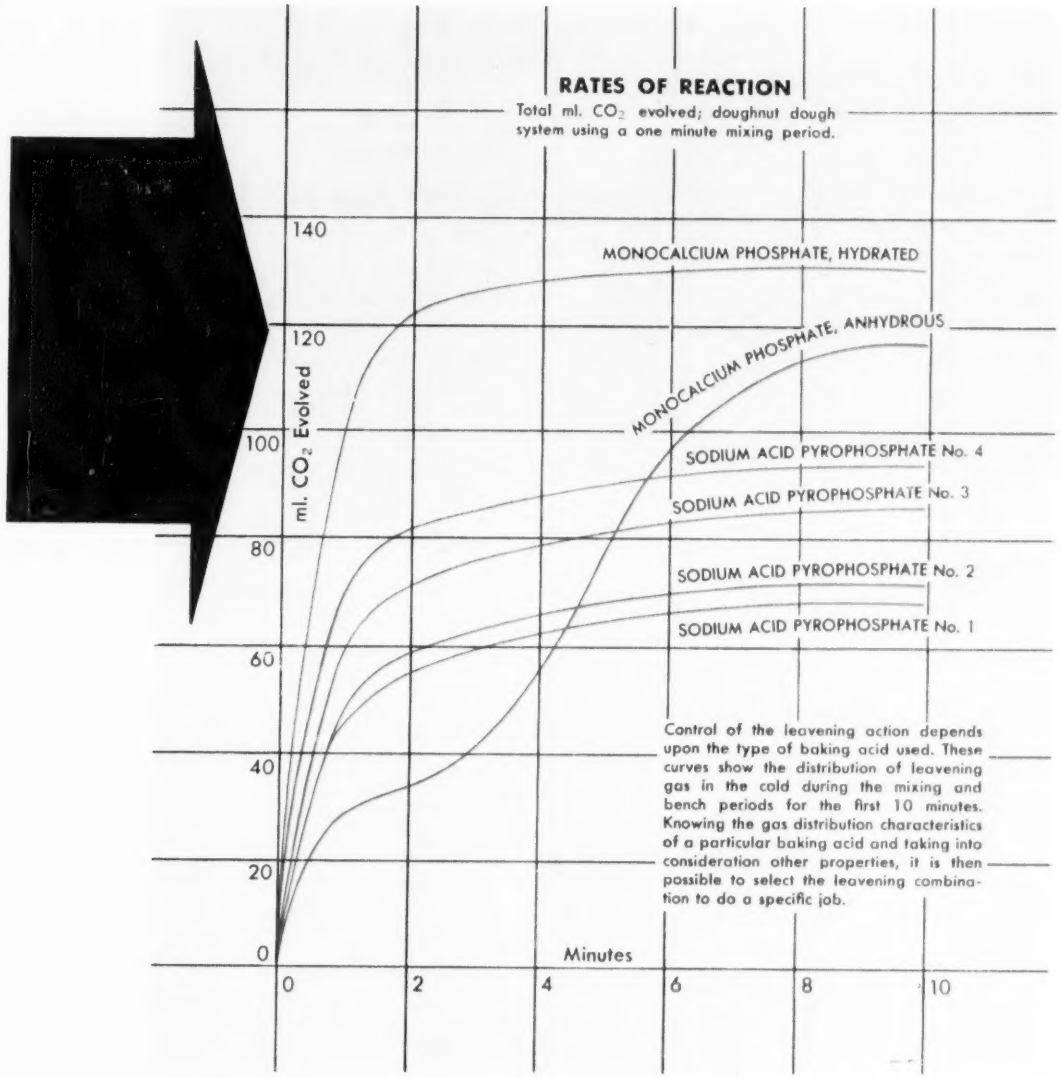
# This success story may save You money and increase Your sales

Finding a leavening combination that does the best possible job for prepared mixes, for self-rising flour, and for doughnuts and commercial cake baking is no easy job. Each flour blend has its own "set of rules" determined by the character of the flour, type of mix, desired shelf-life and baking requirements. That's why so many millers, bakers, and prepared mix people turn to Victor's TAILOR-MADE leavening agents. They know that from Victor's 55 years of experience in the manufacture of chemicals will come the leavening agent with a TAILOR-MADE rate of reaction exactly suited to their needs. Repeat business and growing sales are the payoff.

## Build Your Sales with Victor Chemicals

For 55 years, Victor has specialized in the development and manufacture of phosphates used for leavening, enriching, acidifying, product conditioning, bread improvers, and emulsification. Solving product problems and helping industry to produce better foods with its reflection on sales is our forte. The helping hand of Victor's research department and the efficiency of Victor food chemicals are yours for the asking. Call on Victor today. Victor Chemical Works, 141 W. Jackson Blvd., Chicago 4, Ill. *In the West:* A. R. Maas Division, 4570 Ardine St., South Gate, Calif.

*Plants:* CHICAGO HEIGHTS, ILL. • MT. PLEASANT, TENN. • MORRISVILLE, PA. • NASHVILLE, TENN. SILVER BOW, MONT. • SOUTH GATE, CALIF. • VICTOR, FLA.


RATES OF REACTION
Total ml. $CO_2$ evolved; doughnut dough system using a one minute mixing period.
ml. $CO_2$ Evolved
140
120
100
80
60
40
20
0
MONOCALCIUM PHOSPHATE, HYDRATED
MONOCALCIUM PHOSPHATE, ANHYDROUS
SODIUM ACID PYROPHOSPHATE No. 4
SODIUM ACID PYROPHOSPHATE No. 3
SODIUM ACID PYROPHOSPHATE No. 2
SODIUM ACID PYROPHOSPHATE No. 1
Control of the leavening action depends upon the type of baking acid used. These curves show the distribution of leavening gas in the cold during the mixing and bench periods for the first 10 minutes. Knowing the gas distribution characteristics of a particular baking acid and taking into consideration other properties, it is then possible to select the leavening combination to do a specific job.
Minutes
0
2
4
6
8
10


Note to Mix Makers and Bakers

If you have a leavening problem, bring it to Victor. Victor's experts in leavening will be happy to offer recommendations to you.

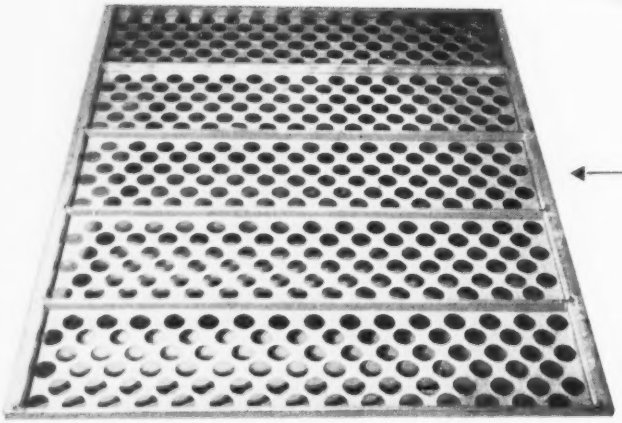
VICTOR

Dependable Name in Chemicals for 55 Years




For more information, use coupon on last page.

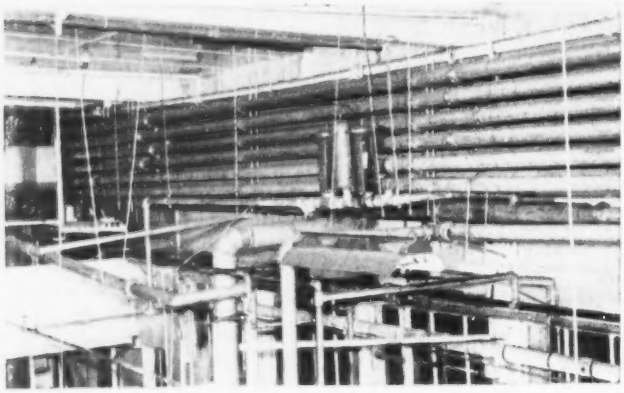
# What's Your Problem?



## This Company Couldn't Keep Fruit from Jumping

This company wanted to make a fruit selector with special sides—to keep apricots, peaches, etc. from "jumping out" as they were sorted.

And Carpenter came up with the answer . . . Type 304 Stainless Tubing in a special trapezoid shape. The slant on the inside of the tubular frame keeps fruit in the selector while it is graded, according to the sizes of holes in the selector.



## This Processor Wanted to Safeguard Purity while Blanching Baked Beans

Quite a different problem . . . but again Carpenter "filled the bill".

This blancher contains over 800 feet of 4" Carpenter Stainless Tubing. It not only safeguards purity but also effectively resists corrosive action of the blanch water.

From jumping fruit to baked beans . . . Carpenter Stainless Tubing helps to make life pleasanter and more profitable for food processors.

What's your problem? We'll be happy to go to work on it. Just drop us a line or call your nearby Carpenter distributor.

THE CARPENTER STEEL COMPANY
**Alloy Tube Division, Union, N. J.**

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y. "CARSTEELCO"

*Carpenter*

**STAINLESS TUBING & PIPE**

Analysis · Tolerance · Finish

**- guaranteed on every shipment**

*Doing Double-Duty for Bardahl*

# Rheemcote poster drums

## Bardahl Products and Bardahl Identification Circle the Globe

Like any manufacturer, Bardahl Lubricants, Ltd. has pride in its product, and its name—and wants the world to know it! That's why you'll find brilliant, colorful 55-gallon Rheemcote Poster Drums on the job for Bardahl, at home and in ports around the globe—moving the product safely, selling the name constantly.

Put your brand name or trade-mark to work on Rheemcote Poster Drums! Rheemcote Containers can be lithographed in any number of colors, any design, including halftones. The high-gloss finish is tough, long-lasting. When necessary, interiors can be roller-coated with special protective lacquers.

Write Rheem for the free colorful booklet describing this powerful new advertising medium. Rheem Manufacturing Company, General Sales Offices, 570 Lexington Ave., New York 22, N. Y.

*Sell as you ship with* **Rheemcote drums**

**RHEEM MANUFACTURING COMPANY** · *Manufacturing Plants in 22 Cities Around the World*

CALIFORNIA: DOWNEY, NEWARK, RICHMOND, SAN PABLO, SOUTH GATE • ILLINOIS: CHICAGO • LOUISIANA: NEW ORLEANS • MARYLAND: SPARROWS POINT • NEW JERSEY: BURLINGTON, LINDEN • TEXAS: HOUSTON • FOREIGN PLANTS—ARGENTINA: BUENOS AIRES • AUSTRALIA: BRISBANE, FREMANTLE, MELBOURNE, SYDNEY • BRAZIL: RIO DE JANEIRO • CANADA: HAMILTON • ITALY: MILAN • PERU: LIMA • SINGAPORE • UNITED KINGDOM: BRISTOL

© 1955 RHEEM MFG. CO.

# The cold facts behind Swift's Premium Ham

Swift & Company—long famous for its hams, as well as its other Swift's Premium branded products—keeps things cold with Worthington compressors in its plants at Chicago, Cleveland, Sioux City, St. Joseph, Mo., Georgetown, Del., Mishawaka, Ind., Philadelphia and Jersey City.

Other big meat-packing names who also use Worthington refrigeration equipment are: Armour, Wilson, Morrell, Hormel, and Miller & Hart.

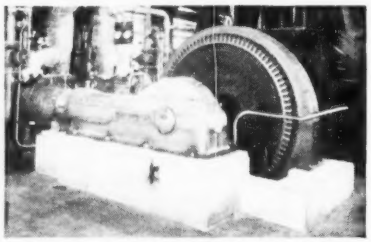
When you call on Worthington for your refrigeration needs, you're assured of the equipment that exactly suits your needs—thanks to the completeness of the Worthington line and its over 100 years' experience with liquid- and gas-handling equipment.

Worthington ammonia compressors, used throughout the meat-packing industry, are available in capacities of 1 to 1,000 tons in *vertical*, *Y* or *horizontal* types. All use Worthington's exclusive Feather* Valves and offer many other features representing the most advanced design in the field.

No other manufacturer makes so complete a line. A Worthington system is all Worthington-*made*, not just Worthington-assembled, for perfect balance in operation and unit responsibility.

Worthington Corporation, Air Conditioning and Refrigeration Division, Harrison, New Jersey.

*Reg. U. S. Pat. Off.

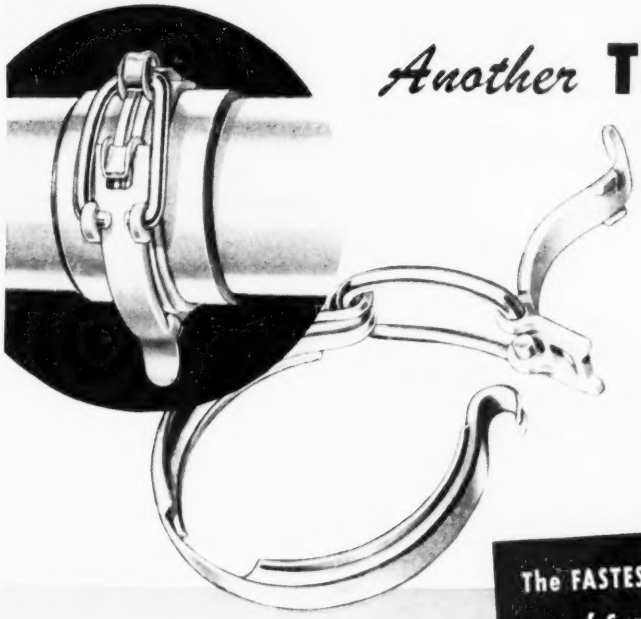


WORTHINGTON horizontal duplex ammonia compressor at Swift & Company's plant in Chicago.

A.2.13

**WORTHINGTON**

**Air Conditioning and Refrigeration**

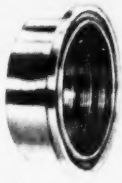


# *Another* TRI-CLOVER *First!*

# TRI-CLAMP

## *Snap-action*
## STAINLESS STEEL SANITARY FITTINGS

**The FASTEST, SIMPLEST, MOST ECONOMICAL METHOD of Sanitary Line Installation ever developed**



TRI-CLAMP recessless ferrule, showing grooved lip to receive molded gasket.

Special precision molded Hycar gasket provides equal pressure around joint.

TRI-CLAMP positive snap-action spring clamp, with toggle locking device securely attached.

**FOR BOTH PERMANENT "C-I-P" AND TAKE-DOWN LINES**

**At right is the special clamp for use with TRI-CLAMP "Cleaned-In-Place" lines . . . a short toggle clamp which can only be opened through the use of a specially-designed hand tool. This prevents accidental opening or tampering with joints in "C-I-P" sanitary lines and provides a visible means of distinguishing between a "take-down" and "permanent" joint.**

*TRI-CLOVER* — The leader in the design and fabrication of quality fittings for over 30 years, now presents TRI-CLAMP fittings . . . another "first," making possible an entirely new concept of sanitary line installation.

*WHAT IT IS:* The TRI-CLAMP Joint consists of a flange type ferrule, precision molded gasket, and the TRI-CLAMP itself . . . a spring clamp which grips ferrule edges with a snap-action toggle assembly . . . always ready for instant assembly or disassembly.

*HOW IT WORKS:* Attach ferrules to tubing, insert gasket into position, slip TRI-CLAMP over ferrules and gasket and snap closed. Thus, *at a flick of the wrist,* you have completed a positive, sanitary leak-tight joint.

*SAVINGS:* Substantial savings have been made in initial material cost per joint over conventional union nut ferrule assemblies. When cleaned in place, cleaning cost has been reduced up to 60%.

*SIZE RANGE:* Available in a full line of fittings for both "permanent" and "take-down" sanitary lines, in 1½", 2", 2½", 3" and 4" sizes in type 304 stainless steel.

*See your nearest Tri-Clover Distributor or write for new Catalog 1-152A.*

*In addition to the full new line of TRI-CLAMP fittings, Tri-Clover offers the complete line of standard 3-A sanitary fittings and valves in both stainless steel and Tri-Alloy, utilizing conventional union nut — Acme thread design . . . as well as sanitary centrifugal pumps, stainless steel tubing, Super Speed Tools and manufacturer's specialties. Write for details.*

5552

**Tri-Clover®**
**MACHINE CO.**
Kenosha, Wisconsin

TRI-ALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

TRI-CLOVER

THE Complete Line

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS



For more information, use coupon on last page.

# MORE!

● Children of all ages really go for butterscotch pudding prepared with MAGNA Imitation Butterscotch Flavor #4 MM&R. It imparts a wholesome, lip-smacking butterscotch taste that brings folks back for more . . . builds sales for you.

The proof of this pudding is in added business for you. Send for a free sample of MAGNA Imitation Butterscotch Flavor #4 MM&R. Get prices and information on all MM&R Essential Oils and Flavors – all premium-quality, all modest in cost and all *proven* sales-builders. Call on MM&R – Food Flavor Specialists since 1895.

M&R MAGNUS

*Magnus, Mabee & Reynard, inc.*

*Since 1895* **ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS**

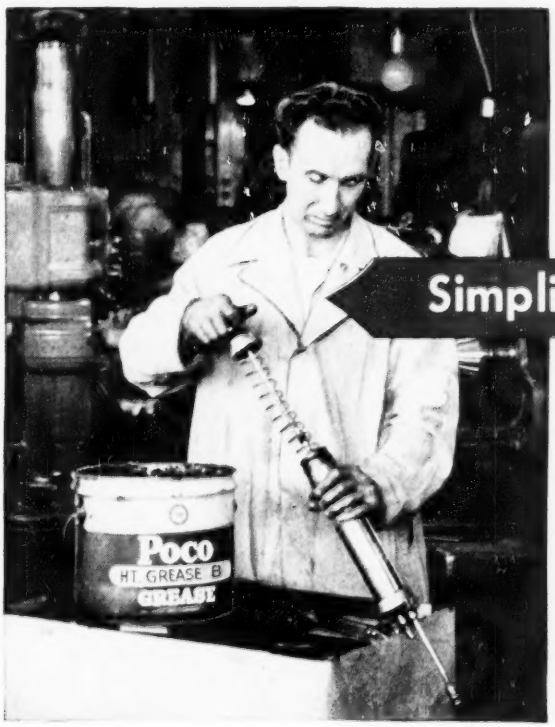
**16 Desbrosses Street, New York 13, N. Y. · 221 North La Salle Street, Chicago 1, Illinois**

# HUNDREDS OF MACHINES—BUT ONLY ONE GREASE!

## Read how another manufacturer simplifies and saves with

# PURE OIL INDUSTRIAL LUBRICANTS

BE SURE PURE WITH PURE




A large midwestern metal-working plant produces chrome-plated trim (hub caps, grills, etc.) for the automotive industry. All types of metal-working equipment —400-ton presses, shears, drills, lathes, roller-levelers and grinders—are used as well as huge chrome-plating machines. Yet *only one grease*—Pure Oil's POCO HT GREASE B—and one dispenser is used for *all* applications! And in 3 years there has been no down time due to lubrication failures.

### Simplify and Save

Here at Pure Oil we specialize in industrial oils and greases designed to do several *different* jobs—instead of one specific job.

And to do each job equally well.

For this reason, our technical experts can nearly always help you to reduce your lubricants inventory . . . simplify your lubricating procedure . . . minimize waste and error.

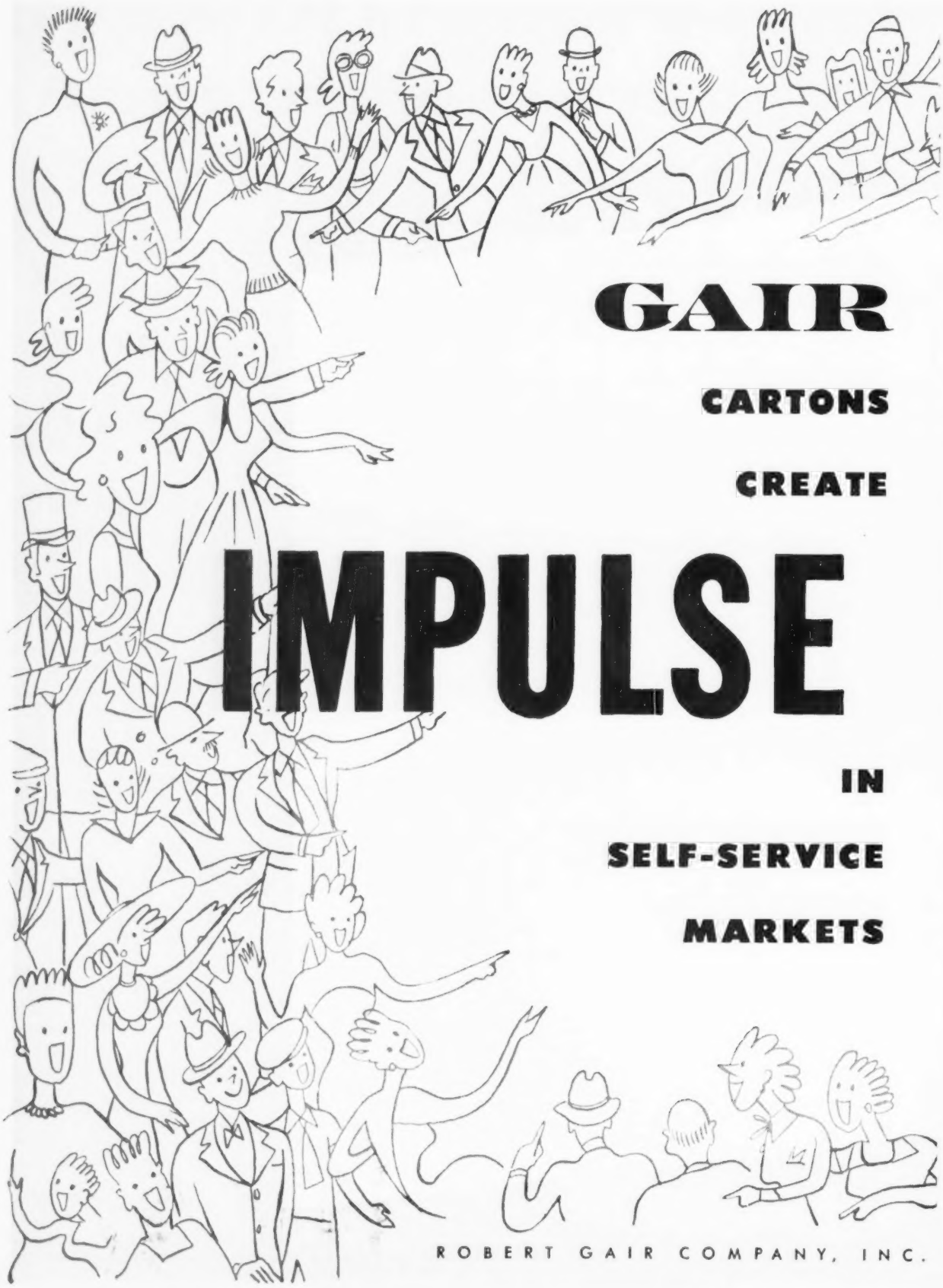
One of our technical experts will be glad to give you full details, right away. Just call your local Pure Oil office* or write:

**THE PURE OIL COMPANY** Industrial Sales
35 E. Wacker Drive, Chicago 1, Illinois

**Be *sure* with Pure**

*Sales offices in more than 500 cities, including: Atlanta, Georgia • Birmingham, Alabama • Charlotte, North Carolina • Chattanooga, Tennessee • Columbus, Ohio • Hattiesburg, Mississippi • Indianapolis, Indiana • Jacksonville, Florida • Madison, Wisconsin • Memphis, Tennessee • Miami, Florida • Minneapolis, Minnesota • New York, New York • Norfolk, Virginia • Parkersburg, West Virginia • Pensacola, Florida • Seaford, Delaware


For more information, use coupon on last page.



# GAIR

## CARTONS CREATE

# IMPULSE

## IN SELF-SERVICE MARKETS

ROBERT GAIR COMPANY, INC.

Increase sales, profit and good will, with dynamic Gair Cartons. More and more, Impulse Buying of a product in Self-Service markets depends on the attractiveness and selling impact of the package.

# BUYING

Safeguard the success of your new package by placing your packaging problem with the Gair organization. Yes! Gair has been designing and manufacturing folding cartons with a powerful "Sales Impact" for almost a century. For complete information

***Write for Brochure on Gair Cartons.***

**GAIR**

PAPERBOARD
FOLDING CARTONS
SHIPPING CONTAINERS

155 EAST 44TH STREET • NEW YORK • TORONTO

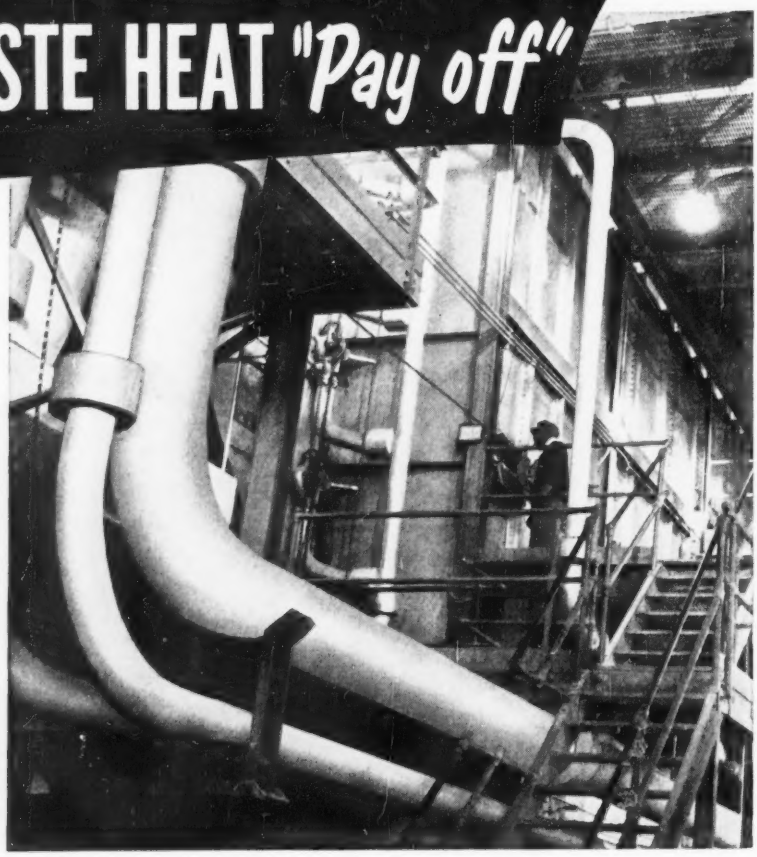


For more information, use coupon on last page.

# MAKING WASTE HEAT "Pay off"

with

## the help of K&M insulations



One of the East's large cement companies gets all the electric power it needs for plant operation by utilizing the waste heat from its cement kilns. This heat is first directed to a boiler which produces a continuous supply of 700°F. steam. This, in turn, is piped to a power-generating turbine—and that's where K&M insulations come in!

So that heat loss is held to a minimum, two effective K&M insulations have been used in combination on the main steam header: a 1½" layer of "Featherweight" 85% Magnesia over a 1½" layer of Hy-Temp insulation. For two smaller boiler-feed water lines, a 1½" layer of "Featherweight" 85% Magnesia is sufficient. All pipes have been finished with a canvas jacket and painted.

K&M "Featherweight" 85% Magnesia is a versatile, dependable, economical insulation for applications up to 600°F. Combined with Hy-Temp, it is efficient on installations having temperatures up to 1900°F. Both materials are supplied in a wide variety of forms and thicknesses.

Your K&M distributor, an experienced applicator, will gladly answer your questions about these products and their uses. Call on him soon, or write to us for complete information.

*Nature made Asbestos . . . Keasbey & Mattison has made it serve mankind since 1873*

**KEASBEY & MATTISON**
COMPANY • AMBLER • PENNSYLVANIA

# STRETCH OUT YOUR STAINLESS, TOO

There *are* ways to stretch out your supply of stainless.

For example, you may be using a grade or finish of stainless that is in extreme demand when another similar one, not as tight, could do the job adequately.

Our metallurgical staff and stainless fabricating specialists are ready to help you look into this matter and to advise you on more readily-available types of stainless that will do a satisfactory job. Feel free to call on us for this specialized help.

**CRUCIBLE** first name in special purpose steels

*52 years of Fine steelmaking*

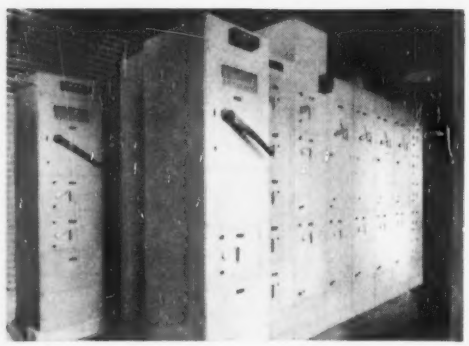
**STAINLESS STEEL**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

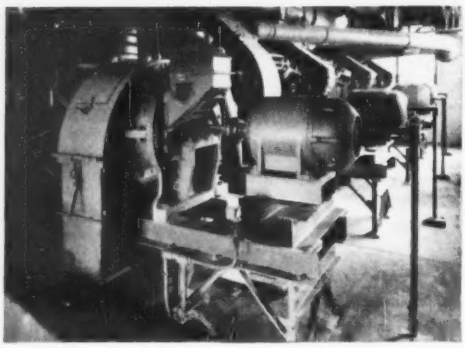
**REZISTAL STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS**



For more information, use coupon on last page.



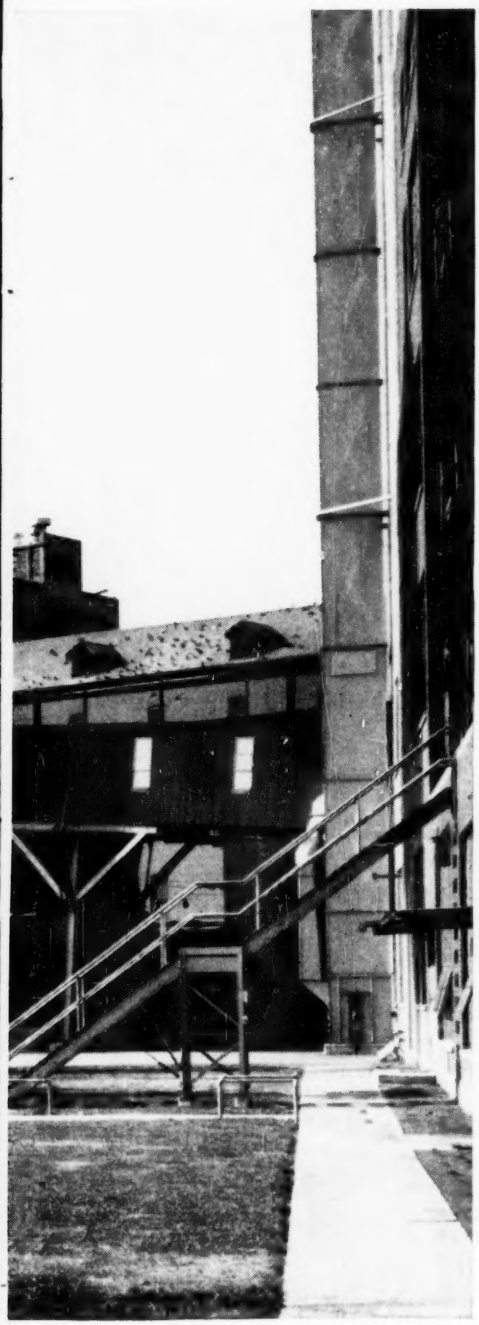
Their motor control equipment is now grouped in dust-tight rooms. This eliminates the need for expensive explosion-proof controls mounted individually near each motor.



Westinghouse explosion-proof motors, powering Prater pulverizers, give them the power and protection for an efficient operation. Special construction features make these corrosion resistant and ideal for tough applications.

***They did what you can do to produce more***

# How Planned Power reduced costs for this food plant



In planning power for their new grain mill, a big Midwestern processor wanted an electrical system that would be simple, flexible, and minimize costs and yet handle the explosive problem present in all grain mills. Knowing of the engineering experience Westinghouse has in the food industry, they called on them for help in the planning.

### *Help in planning the entire system*

From the incoming power transformers, through the entire plant to the power utilization points, the entire system was designed to provide the right equipment and to meet the individual needs of each part of the installation.

### *Special motors meet explosive conditions*

To meet the explosive conditions encountered in grain mills, Westinghouse offered special explosion-proof motors ideally suited to this type of installation. Westinghouse now offers a motor for this purpose which meets both types of requirements encountered in grain mills—it keeps out explosive dust and should explosive air seep in, the resultant explosion is confined within the motor. Formerly two separate types of motors were required for these two types of service.

### *Separate control centers reduce equipment costs*

Instead of using separate explosion-proof controls near each motor, Westinghouse recommended a modern control center with the controls grouped in neat, compact cabinets in sealed-off, dust-tight rooms (see photos, lower left). The installed costs were lower as the units are factory made, easily installed and easily wired. And the controls are highly accessible, which results in lower maintenance costs.

### *Call Westinghouse early on every project*

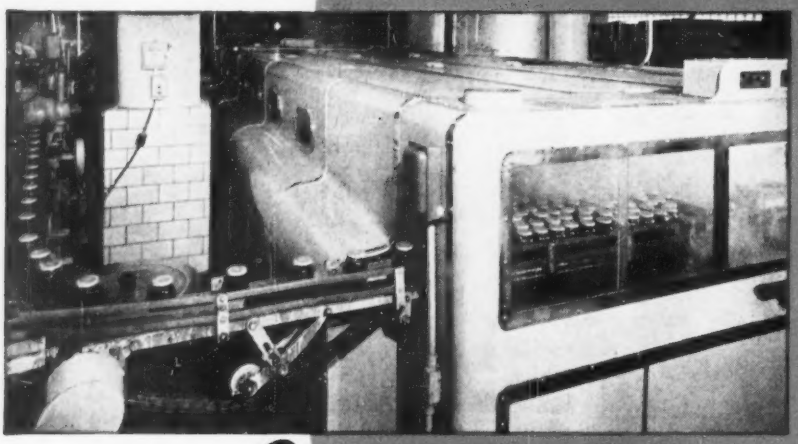
Westinghouse makes a complete line of electrical equipment for food processing. Call us on YOUR next project; you can get moneysaving results like these. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pennsylvania. J-94951

YOU CAN BE SURE... IF IT'S

Westinghouse

# THE VORTEX

## ASSURES ECONOMICAL, CONTINUOUS



## Automatic Cooling

## FOR Louis Sherry PRESERVES, INC.

**Packed by Palmer Fruit Products Co.**
**Long Island City, N. Y.**

The "Vortex" method of cooling packaged products greatly reduces operating costs and achieves the positive time and temperature control which a quality product deserves. Entirely automatic in operation, it runs continuously with no operators required.

Heat transfer is accomplished by the famous Barry-Wehmiller "Vortex" system of atomized water sprays. The patented "walking beam" conveyor with two moving grates moves containers through the cooling cycle. Hydraulic drive not only dispenses with chains, gears and cams, but uses less power and holds friction to a minimum. Finger tip, automatic speed control accurately adjusts process time

The "Vortex" coolers, pasteurizers and exhaust boxes have a wide variety of application in the food and beverage field. Write for bulletins and complete information

Louis Sherry
NEW YORK

THE SUN NEVER SETS ON B-W BOTTLE CLEANERS, PASTEURIZERS & PROCESSORS

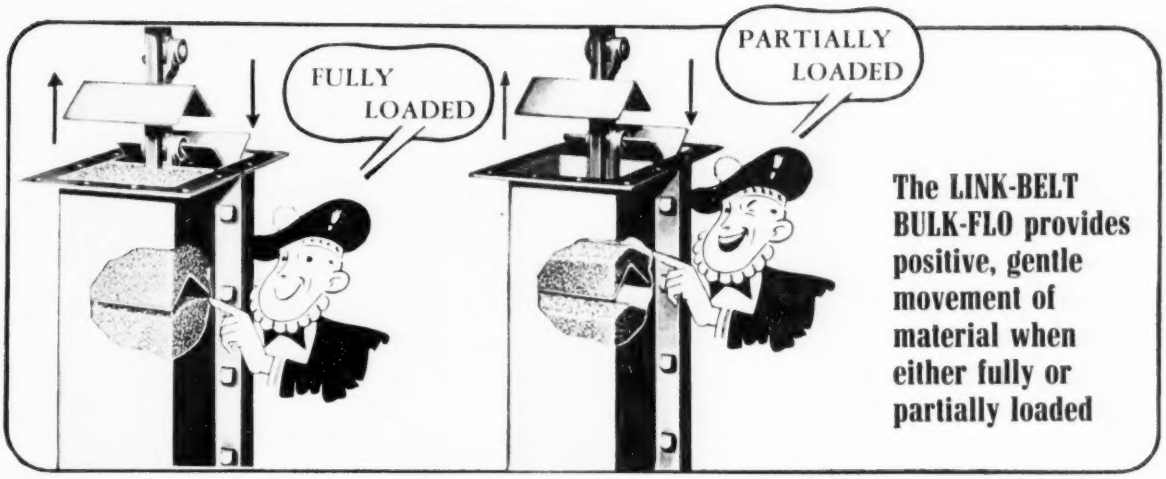
**BARRY-WEHMILLER MACHINERY CO.**

4660 WEST FLORISSANT AVENUE • ST. LOUIS 15, MO.

IN GREAT BRITAIN — BW — BARRY-WEHMILLER MACHINERY CO. LTD. MILL GREEN ROAD, MITCHAM JUNCTION, SURREY, ENGLAND

287

# Combined feeder · conveyor · elevator cuts your handling costs



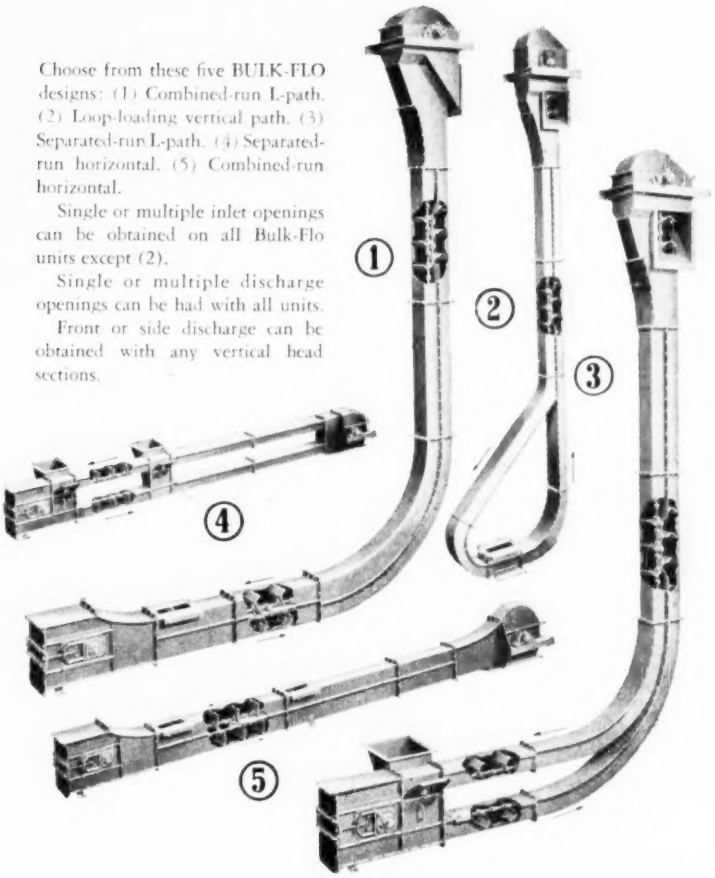

**The LINK-BELT BULK-FLO provides positive, gentle movement of material when either fully or partially loaded**

Choose from these five BULK-FLO designs: (1) Combined-run L-path. (2) Loop-loading vertical path. (3) Separated-run L-path. (4) Separated-run horizontal. (5) Combined-run horizontal.

Single or multiple inlet openings can be obtained on all Bulk-Flo units except (2).

Single or multiple discharge openings can be had with all units.

Front or side discharge can be obtained with any vertical head sections.




BULK-FLO gives you true versatility in bulk materials handling . . . at lower cost. It replaces several units in less space . . . cuts initial outlay. And because solid flights operate independently of internal pressure, BULK-FLO can be operated at less than full capacity, with positive movement of materials.

That means capacity can be varied by regulating the feed. It also means gentler handling —material is protected in individual "compartments" to minimize degradation.

And note this—regardless of the amount of material being fed, BULK-FLO is self-clearing through intermediate runs. This feature allows you to alternate batches of different materials and prevents contamination.

You can get complete information on BULK-FLO from the Link-Belt office near you. Or write for your copy of Book 2175.

**LINK-BELT**

**BULK-FLO**
**FEEDERS - CONVEYORS - ELEVATORS**

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in Principal Cities. 12,662-B


For more information, use coupon on last page.

## *News in 1940*—production necessity today

ONLY a few years ago, the science of sensitive, accurate measurement was limited to laboratories. But today, this science is practiced every day in thousands of industrial plants by factory men . . . who don't have to be instrument experts.

Production men wanted to put this science to work, for they had long known that many processes would function at greater efficiency if temperature, pressure and other variables could be more accurately maintained. Although these potential benefits could be proved in the laboratory or in pilot plants, they could seldom be exploited fully in actual production.

### Milestone in measurement

One of the main reasons was that existing industrial methods of measurement were not sufficiently accurate, sensitive or fast. Instruments with delicate mechanical balancing systems suffer inherent limitations . . . always require a compromise between sensitivity and ruggedness . . . and can provide only periodic measurements.

Then, in 1940, the advent of *ElectroniK* instruments swept away these limitations. By adopting an entirely new approach—electronic continuous balancing—these instruments revolutionized the concepts of industrial measurement. They placed laboratory accuracy and sensitivity at the disposal of the production man . . . with all the simplicity and ruggedness demanded by industrial service . . . *plus* speed of response never before economically practical.

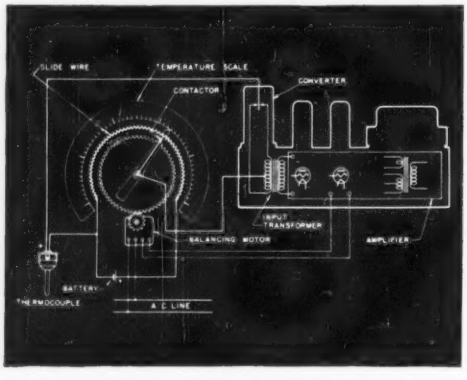
### Proved by years of performance

In the past thirteen years, thousands of plants have discovered almost endless applications where the superior performance of these instruments helps to improve operations. The more they learn about *ElectroniK* instruments, the more they call on them for increasingly complex tasks of measurement and automatic control.

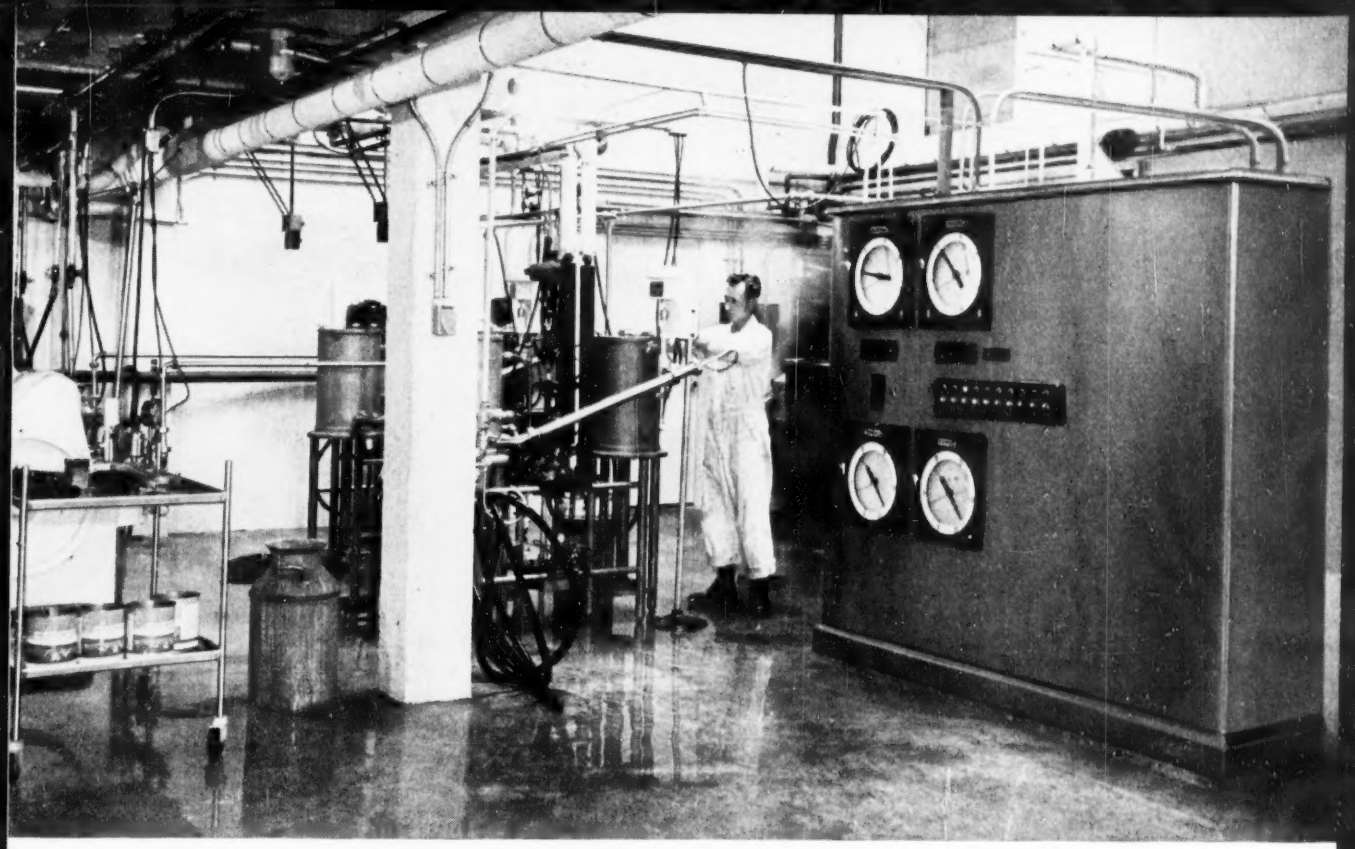
Since 1940, the *ElectroniK* family has grown to encompass a host of new indicating, recording and controlling models . . . capable of measuring scores of different process variables . . . equipped with the most advanced types of automatic control. In anticipation of the needs of the future, Honeywell's intensive development program is bringing to readiness even more advanced equipment for tomorrow's process control problems.

# Canning fresh with the

**A FAMILIAR SIGHT** *to thousands of production men, scientists and engineers is this strip-chart* ***ElectroniK*** *Recorder, one of a complete family of indicating, recording and controlling instruments.*




**POWER PLANT** *of* ***ElectroniK*** *instruments amplifies a millionfold the minute electrical signals from thermocouples and other sensing elements.*



**COMPLETE SAFETY** *is the watchword in aseptic canning of whole milk . . . safeguarded by* ***ElectroniK*** *instruments that control vital temperatures.*

# whole milk *help of ElectroniK control*

FRESH whole milk from machine dispensers! This isn't just a dream, but a reality soon to appear on the market. And it has been made possible by means of a revolutionary canning process which utilizes the Martin aseptic filler—in which *ElectroniK* instruments play an essential part.

A system developed by International Milk Processors already applies this technique to canning whole milk for overseas shipment, and soon will supply canned milk for coin machine dispensers.

Extremely close control is required at every stage of processing, in order to insure thorough sterilization. To provide the desired precision and convenience, Honeywell engineers designed a packaged control system which completely coordinates the regulation of preheaters, homogenizers, sterilizers and canning equipment. Instrumentation includes automatic shutdown and alarm if critical temperatures depart from specified values.

At the forefront of progress in the food industry, you'll find Honeywell instruments and engineering know-how working hand in hand with forward-looking technologists. Our local engineering representative is well qualified to discuss ways to apply this experience to your plant's processes. Call him today . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Penna.

● **REFERENCE DATA:** Write for Data Sheet No. 3.2 15-A, "Aseptic Canning Process."

MINNEAPOLIS
**Honeywell**
BROWN INSTRUMENTS
*First in Controls*

# This is Why the Nash is the Most Simple Compressor

# *It's the Nash!*

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

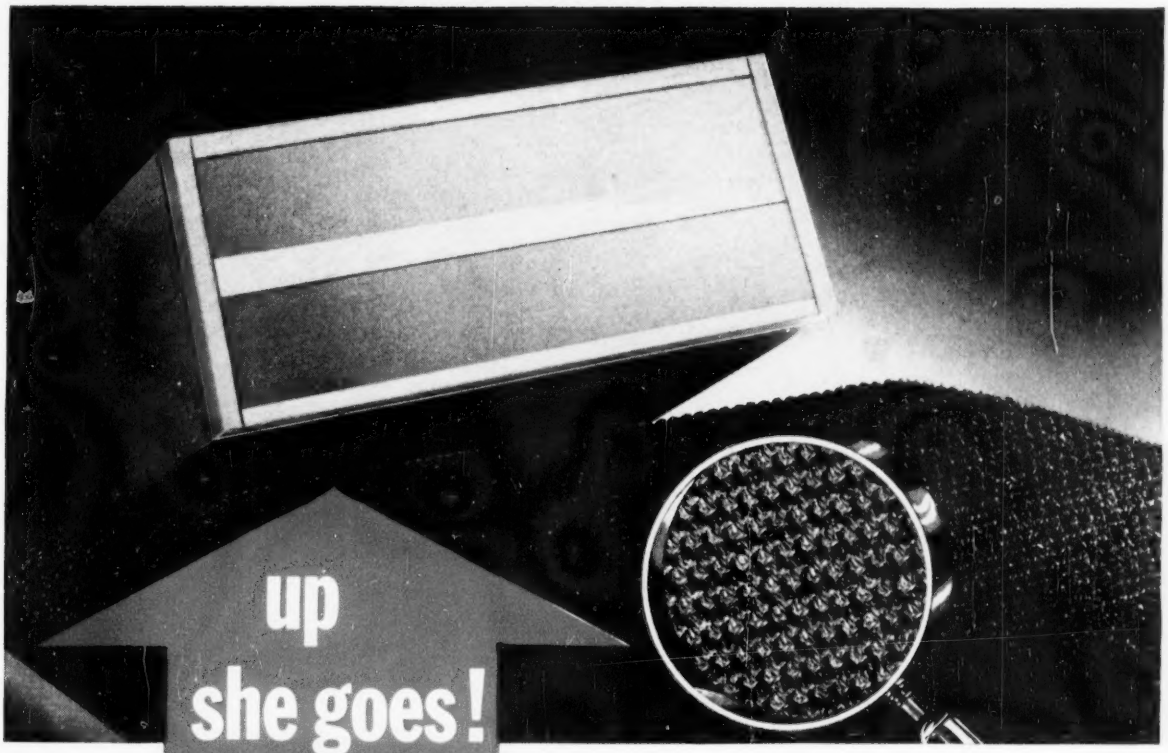
The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

**NASH ENGINEERING COMPANY**
**313 WILSON, SO. NORWALK, CONN.**



# up she goes!

## gripped by thousands of tiny rubber fingers

### Thermoid Ruff-Top Conveyor Belting Moves Packages Steadily on Steep Inclines

Thermoid Ruff-Top actually grips the package. Holds it in place as it moves up or down inclines of as much as 35 degrees . . . thus saving valuable floor space.

Thousands of little, specially shaped rubber points on the surface of the belt do the trick. These keep packages from slipping and jamming. Obviate the need and expense of cleats.

Whatever your belting problem, Thermoid has the answer. And because Thermoid conveyor belts are made of finest materials . . . designed to meet specific needs, they provide that extra margin of endurance that reduces costs.

Call the Thermoid distributor. He is always ready to help you select the belt best suited and most economical for your job. Or write direct for Thermoid Conveyor Belting Catalog No. 3679.

Thermoid Industrial Rubber Products — Quality — Service

**It will pay you to Specify Thermoid**

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

**Thermoid**

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



For more information, use coupon on last page.

# GET MORE STRENGTH AT THE SEAMS

## ...with tailor-made Riegel papers

*A few things RIEGEL can do for you . . .*

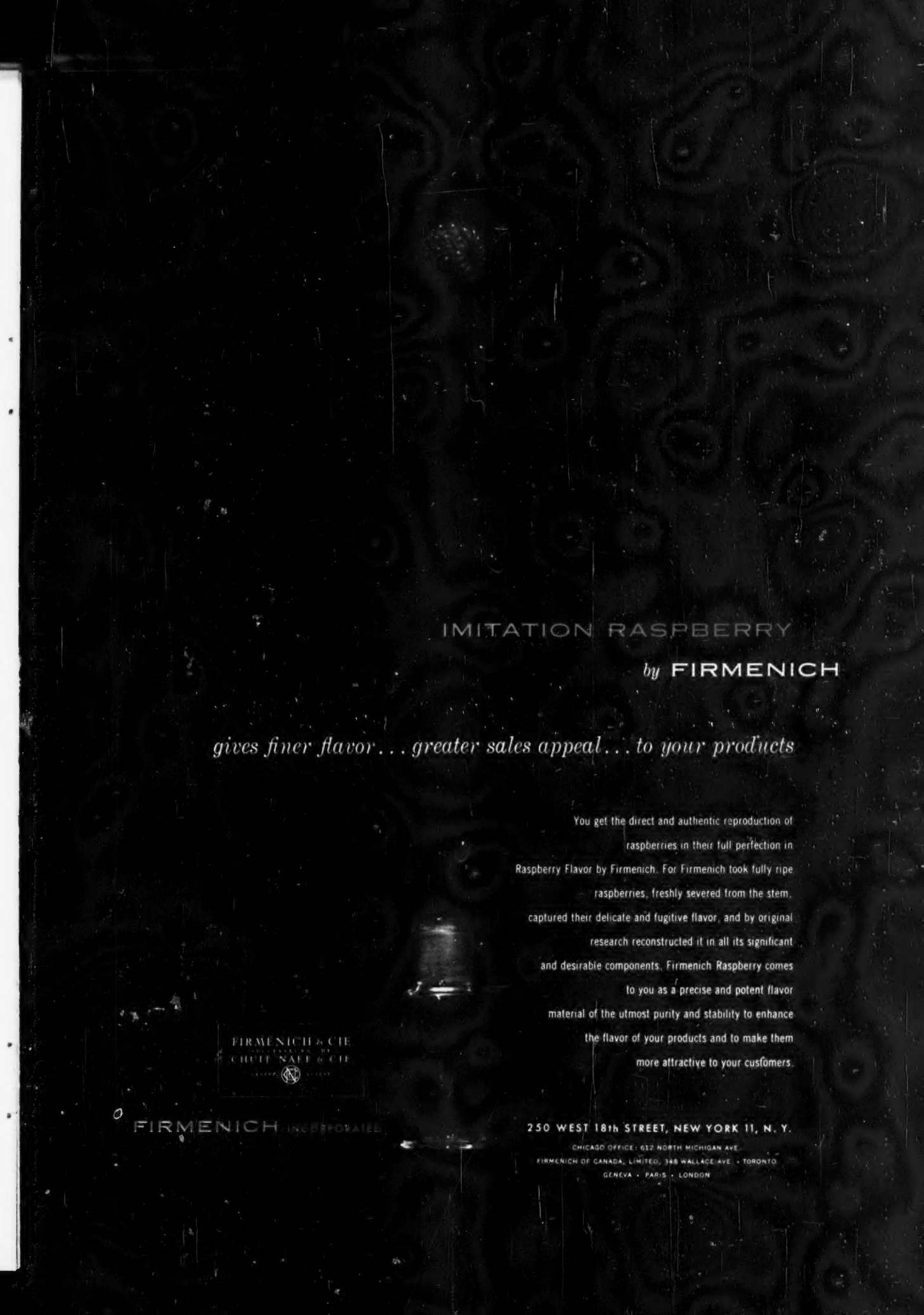
- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
- Provide wet strength
- Stop grease penetration
- Retain aromas, flavors
- Resist extreme cold
- Reduce breakage
- Prevent sifting
- Protect from light
- Resist alkalis
- Resist corrosion
- Boost machine efficiency

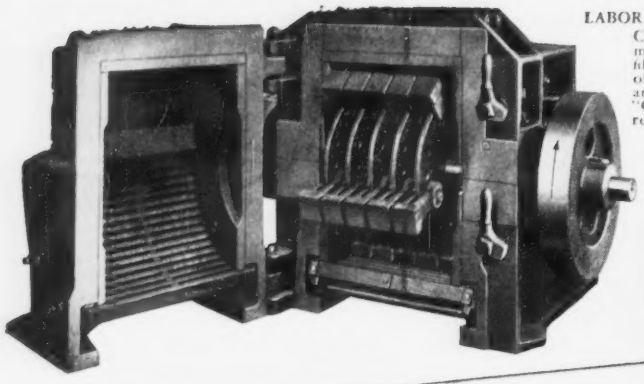
A SHEET OF PAPER doesn't make a package until you add a seam. Getting a strong, uniform seal at high speed poses one of the most vital problems in functional packaging. It is a problem Riegel has solved for hundreds of different products, from cereals and desserts to chemicals and drugs. Invariably the paper must also combine many of the protective functions listed at left. In one case the answer may be a simple glassine for high-speed glue sealing . . . in another it may be a triplex lamination of foil and special glassines for heat-sealed, vapor-proof packages.

Whatever *your* packages may need, Riegel can develop the right papers . . . quickly, efficiently, economically. Write to *Riegel Paper Corporation, P. O. Box 170, Grand Central Station, New York 17, N. Y*

**Riegel** FUNCTIONAL PAPERS FOR PROTECTIVE PACKAGING

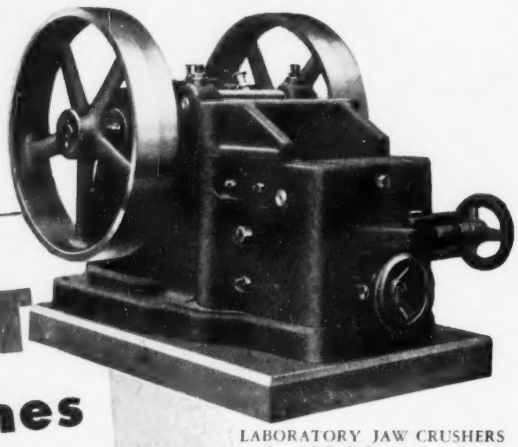
▶ WRITE FOR SAMPLE BOOK


IMITATION RASPBERRY
by FIRMENICH
gives finer flavor . . . greater sales appeal . . . to your products
You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it in all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to make them more attractive to your customers.
FIRMENICH & CIE
CHUIT NAEF & CIE
FIRMENICH INCORPORATED
250 WEST 18th STREET, NEW YORK 11, N. Y.
CHICAGO OFFICE: 612 NORTH MICHIGAN AVE.
FIRMENICH OF CANADA, LIMITED, 348 WALLACE AVE. • TORONTO
GENEVA • PARIS • LONDON



LABORATORY SWING-SLEDGE MILLS

Capable of reducing soft, moderately hard and tough or fibrous materials to any degree of fineness between 1 in. and 20 mesh. The patented "Open-Door" feature permits ready accessibility for cleaning.



# STURTEVANT

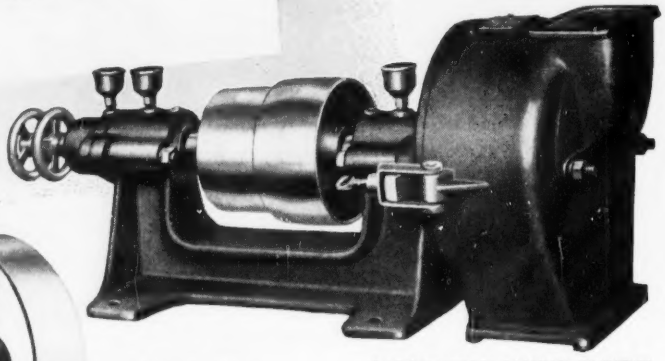
## Laboratory Machines

### Assure Quality of Products

### Fast - Economical - Accurate

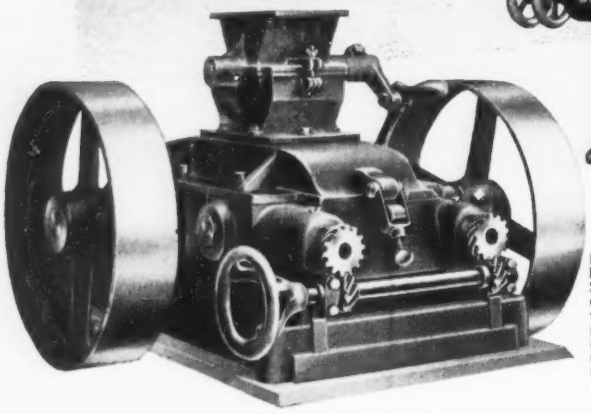
LABORATORY JAW CRUSHERS

Special Roll Jaw action simplifies close regulation of the product with capacities varying from 300 or 400 lbs. per hour at finest settings, to 1000 or 2000 lbs. when opened for coarser work. Each part of the crusher is accessible for quick and easy cleaning.



LABORATORY SAMPLE GRINDER

Laboratory Sample Grinders are of the "Open-Door" disc type and are capable of very fine work, producing products as fine as 100 mesh (coarser if desired) when working on dry, friable, soft or moderately hard materials. Simply turn hand wheel to provide product regulation from 10 to 100 mesh.



LABORATORY CRUSHING ROLLS

First designed especially for laboratory sampling work, Sturtevant Crushing Rolls are used regularly in many plants where there are limited outputs. Range of output for the 8 x 5 size is from $\frac{1}{2}$ in. to 20 mesh — and for the 12 x 12 size from $\frac{3}{4}$ in. to 20 mesh.

The only sure way to maintain strict quality of products is laboratory control . . . and that calls for accurate sampling.

Sturtevant Laboratory Equipment meets the exacting requirements of laboratory work. They are fast and accurate . . . provide true samples.

Rugged and dependable, Sturtevant equipment actually has all the features of full size machines plus extra accuracy and wider range of adjustment. The "Open-Door" accessibility permits quick, thorough cleaning . . . prevents the possibility of previous batches from contaminating new samples.

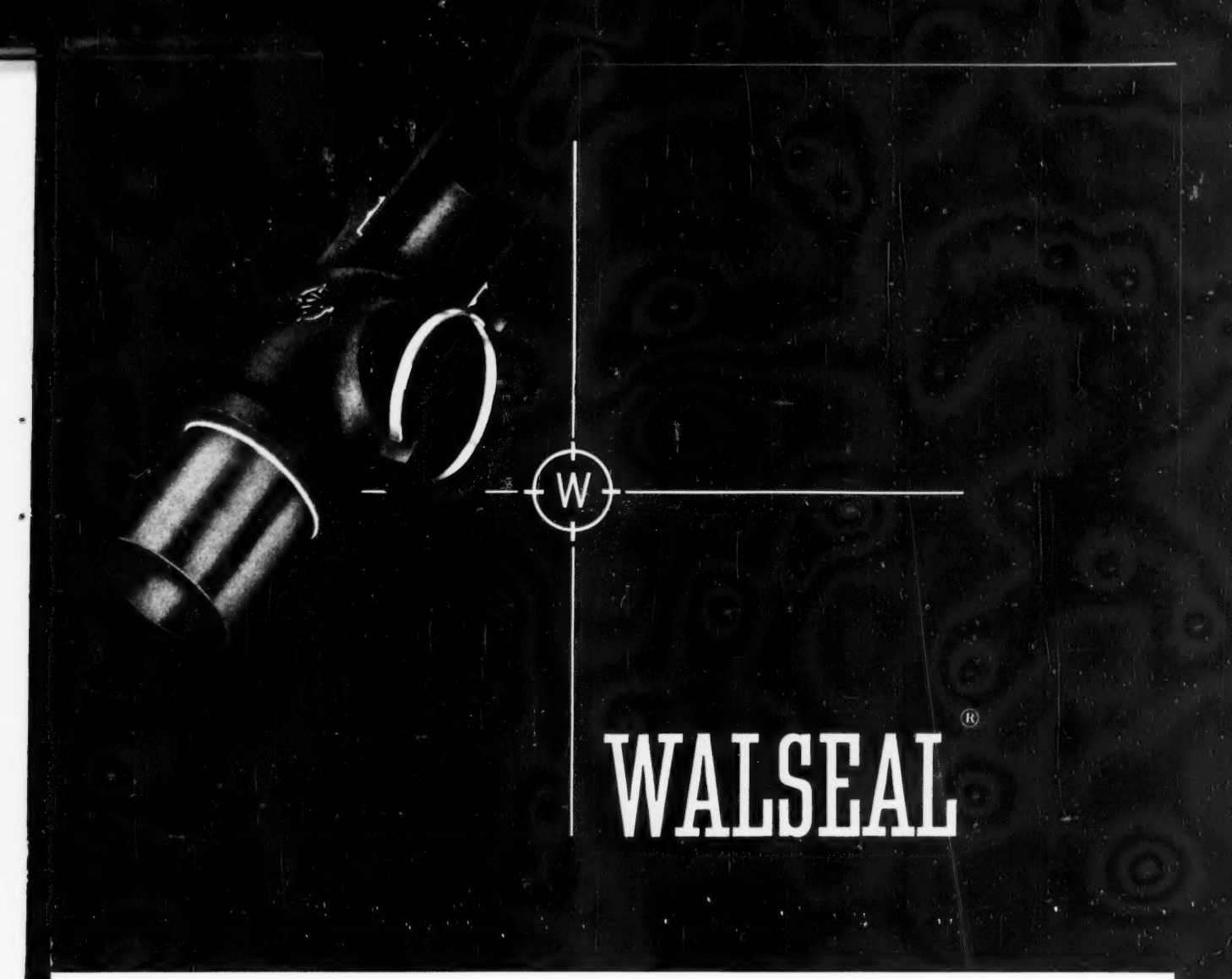
Investigate Sturtevant equipment for your laboratory. It will cut your sampling costs . . . help maintain strict quality of products . . . increase sales. Write for complete details and catalog.

**STURTEVANT MILL COMPANY**

106 CLAYTON STREET, BOSTON 22, MASS.

*Designers and Manufacturers of:*

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

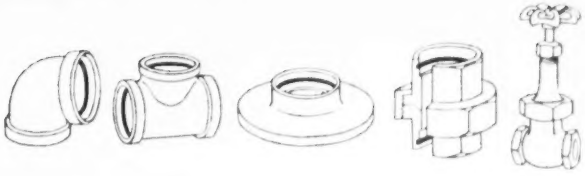


# WALSEAL®

## COMPLETE LINES OF WALSEAL VALVES AND FITTINGS

WALSEAL is a smooth-bore, bronze valve or pipe fitting having a **factory-inserted** ring of silver brazing alloy in the outlet or outlets. The brazed joint that results when a Walseal product is installed is leakproof, vibration-proof, and corrosion resistant. The alloy fillet that appears upon completion of the joint is visual assurance of **full penetration of alloy.** This improved method of joining brass, copper, or copper-nickel pipe or tube is another Walworth contribution to the progress of the valve and fittings industries.

In addition to its complete line of Walseal products, the Walworth Company manufactures complete lines of valves, fittings, unions, and flanges in a wide range of sizes and temperature-pressure ratings. The company also makes three lines of pipe wrenches, the Genuine Stillson, Walco, and Parmelee. Walworth products total approximately 50,000 items and are sold through distributors or agents in all parts of the world.



The sectioned Walseal tee illustrated, shows: (a) the fillet of alloy that appears upon completion of the Walseal joint. This fillet is your visual assurance of complete penetration. (b) the factory-inserted ring of silver brazing alloy. (c) sectioned view of the completed Walseal joint showing penetration of alloy both ways from the insert. Walseal joints can be made only with Walseal valves or fittings. For further details regarding Walseal products, ask for Circular 84.

# WALWORTH

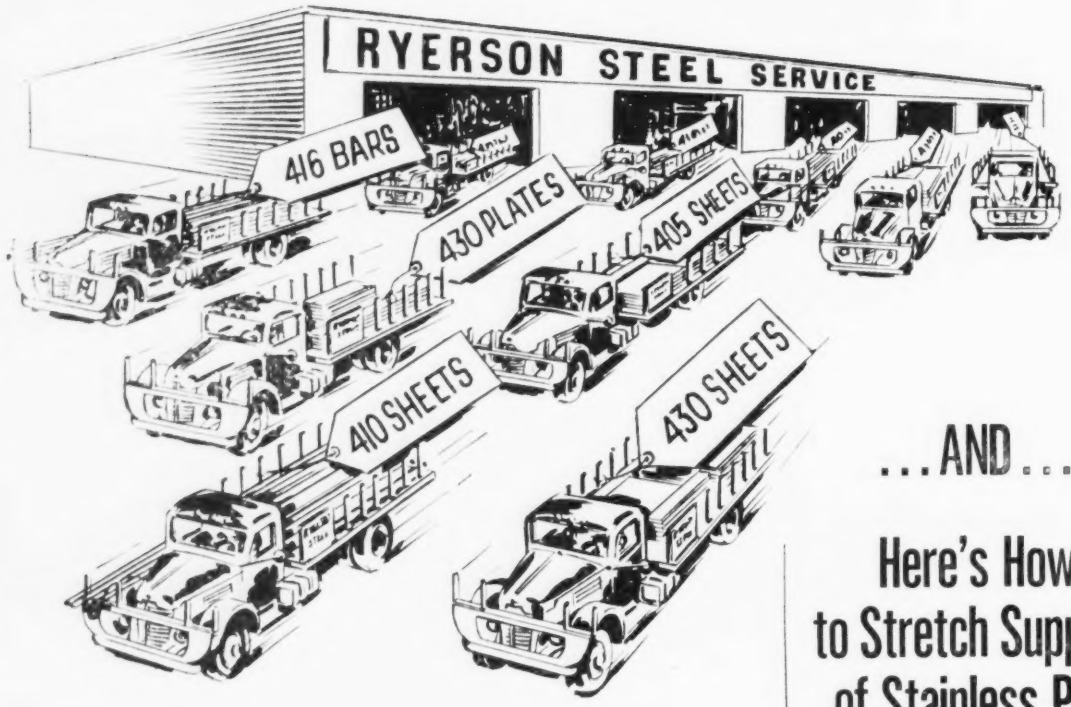
*Manufacturers since 1842*

**valves . . . fittings . . . pipe wrenches**

**60 East 42nd Street, New York 17, N. Y.**

SEE OUR CATALOG IN SWEET'S

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD




# Stainless in Stock

## Straight Chrome in Every Gauge & Size

As stainless users switch to straight chrome types, Ryerson is ready for them. Ready with the nation's largest and most diversified stocks of straight chrome stainless steels.

Our stocks are large because we began building them months ago —when it first became evident that the use of nickel would be restricted. As a result, you can maintain your stainless production now, despite restrictions, by calling Ryerson.

All the straight chrome steels shown on the tags above are on hand in a wide range of gauges and sizes. So we are in a good position to handle almost any requirement. And all are time-tested Allegheny stainless steels of definitely established performance.

If you are looking for a metal to replace nickel-bearing steels, we urge you to consult our stainless specialists. Then draw on our large stocks of straight chrome types. A special technical bulletin on chrome stainless alternates for various applications of 18-8 stainless has just been published. Write for your copy.

*Warehouse Distributor of Allegheny Stainless in All Types, Shapes and Sizes*

...AND...

## Here's How to Stretch Supplies of Stainless Pipe

Here's an example of how you can secure additional footages of stainless pipe during this period when nickel is short and allotments cut to the bone:

You can buy 280 feet of 4" Schedule 5 (light wall) stainless pipe on the same nickel bearing stainless allotment required to buy approximately 100 feet of Schedule 40 (standard) stainless pipe of the same size. Or if you prefer a slightly heavier wall, you can buy 195 feet of Schedule 10 pipe on the same allotment. Either way you can increase your footage whenever Schedule 5 or Schedule 10 pipe will do the job.

It's very possible that our experienced stainless specialists may be able to suggest ways to stretch the stainless supplies alloted to your specific operation. Consult them freely without obligation.

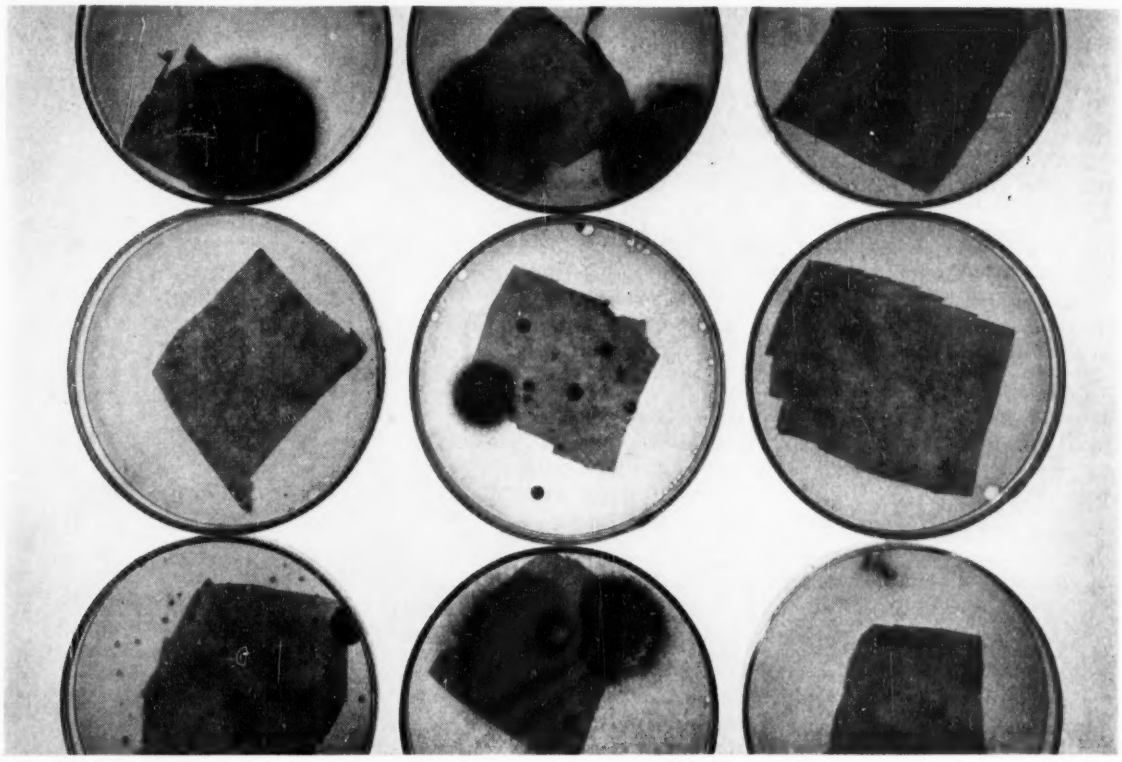
* * *

OTHER RYERSON PRODUCTS

CARBON, ALLOY AND STAINLESS STEELS — BARS, STRUCTURALS, PLATES, SHEETS, TUBING, TOOL STEEL, BABBITT METAL, INLAND 4-WAY SAFETY PLATE, METAL WORKING MACHINERY AND TOOLS, ETC.

# RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SEATTLE • SPOKANE



PREVALENCE of molds on liners of paper bags is demonstrated by incubating sections on Mycophil agar.

# *Pinning Down* Bag-Borne Bacteria

Tests on paper bags reveal microorganisms which can transfer to product. And even small sacks may carry organisms in sufficient numbers to degrade contents

**WM. L. OWEN**

The Wm. L. Owen Laboratories, Baton Rouge, La.

Can such food containers as paper bags carry and support microorganisms? And can such organisms be deleterious to the goods?

These questions are becoming increasingly pertinent to processors due to the broadening efforts against contaminants.

Notably, there are the growing restrictions that industrial users of refined sugar are placing on allowable limits of microbial contaminants. These are making it imperative for the refiner to investigate every conceivable factor that may contribute to such adulteration.

As long as the concern of the standards was limited to thermophilic bacteria, whose principle origin was the equipment or the raw sugars, there was no object in seeking sources of post-refining contaminants.

But with the rigid restrictions proposed by the American Bottlers of Carbonated Beverages—that sugar used in their field shall contain no more than 10 molds per 10g.—one can no longer assume that the container in which the sugar is packed is sufficiently free from these contaminants to be exempt from rigid investigation.

## Dairies Faced Similar Problem

In the handling of milk and ice cream, the microbial content of the container comes under very rigid scrutiny by local and national health agencies. Today one can be assured that the containers for these products are so free from contaminants that they do not contribute to any appreciable degree to the indigenous microbial flora of the contents.

It should be remembered and emphasized, however, that this "bill of health" for paper containers was not attained without the expenditure of much time and effort on the part of national health agencies and research staffs of paper manufacturers.

Wrapping material for butter has long been known as a possible contributor to the development of mold fungi. Macy and his co-workers,* who investigated this problem in 1927, found that butter packaged in sterile parchment did not develop mold when stored for 90 days at 40 and 55 deg. F., while samples wrapped in unsterile parchment molded within 48-70 days

* *Creamery & Milk Plant Monthly*, 16, 38-40, 1927.

at 55 and in 60/90 days at 40 deg. F.

The writer recalls when, as research director of a large bakery, he carried out a comprehensive investigation of the incidence of moldy bread, which at that time was very serious. In these experiments, large numbers of loaves were taken directly from the oven and sealed in sterile bags, while an identical number of others were taken in precisely the same manner but wrapped in the regular wax wrappers taken from stock. Loaves were then placed on shelves and allowed to remain under constant observation for varying periods.

Results: those in sterile bags showed little if any mold growth over a period of weeks, while those in the wax wrappers began to show mold within a few days, and after a week all were fully covered with mold growth.

## Bakeries, Too

Manufacturers of bread wrappers became keenly aware that the conventional method of manufacturing and handling their product was inadequate for the baking industry. They promptly refined their methods so as to reduce the microbial contamination of these wrappers. Today, as far as the writer is aware, the baker can be reasonably assured that the wrapper will not contribute to deterioration of the loaf of bread enclosed therein.

When sugar conforms to microbiological standards *before* bagging, it might appear fantastic to suppose that the container could ever be a factor in preventing it from conforming *afterward*. But such an assumption cannot be predicated upon such superficial inferences. Bagged sugar is sampled by thrusting a "sugar tryer" through the sides of the bag, then withdrawing it and depositing the sample held within its tubular section into a sampling jar. And this method forces the microbial contaminants from the inner walls of the bag into the sample, thus giving a fictitious and inflated value to the microorganisms contained in the sugar itself.

A second assumption which might very well be equally erroneous and misleading is that the microbial contaminants contained in a paper bag are uniformly distributed over its interior surfaces. If this were true, there would rarely, or never, be the slightest chance of the contamination of the bag influencing noticeably or appreciably the actual numbers of microorganisms in the sugar that it contains.

However, the degree of contamination of different parts of a bag is highly variable. And in some cases the greater part of the total microbial content may be in certain limited areas of the total interior surface.

In short, this question of the container's role in disqualifying refined sugars for acceptance by bottlers, canners or meat packers is very critical. So much so, in fact, that many companies producing sugars for these industries, have submitted the problem to this laboratory for a comprehensive investigation. From the refiners we have received, for test, paper bags representative of the product of many manufacturers.

## Plan of Experiments

Our investigation was designed to determine—

(1) Average concentration of microorganisms (mesophilic) per sq. in. of the interior surfaces of paper bags used for packaging refined sugars.

(2) Variation in this concentration in bags from different manufacturers.

(3) Degree to which the bag might contribute to mold and yeast counts on sugars packed within it.

(4) Whether the bag could contribute the specific type of contamination that would make the sugar packed inside unacceptable.

Here were the methods we used in the investigation:

(1) Sampling sections (1 sq. in.) of the bag by incisions with sterile shears, and washing off the inner surfaces into sterile Petri dishes, into which were introduced sufficient liquefied nutrient agar to cover the sections, and incubating for four days at 34 deg. C.

(2) Transferring 1-in. sections of the bag—removed aseptically after the outer surface was sterilized with a strong chlorine solution—to plates of solidified nutrient agar, with the inner surface of the sections in direct contact with the medium.

(3) Making an analysis of sugar from a previously unopened bag, then transferring the sugar to a new bag and repeating the analysis after thoroughly mixing the transferred sample

(*Turn to page 132*)

**TABLE I—PRESENCE OF BACTERIA** Shown When Bag Sections (1 Sq. In.) Are Washed With Sterile Water and Plated on Agar

| Sample No. | Capacity of Bag (Lb.) | Manufacturer | No. Bacteria Per Bag |
|---|---|---|---|
| 1 | 100 | A | 1,100 (12 in. lower section used) |
| 2 | 5 | B | 500 |
| 3 | 5 | C | 800 |
| 4 | 5 | D | 300 |
| 5 | 5 | E | 500 |
| 6 | 5 | F | 600 |
| 7 | 5 | G | 600 |

**TABLE II—DISTRIBUTION** of Microorganisms On Various Portions of Interior Walls of Bags

(Sections were cut from different portions of bags and inner surfaces of these sections washed into plates with sterile water.)

| Sample No. | Capacity of Bag (Lb.) | Manufacturer | No. Bacteria Per Section (Sq. In.) | No. Per Bag |
|---|---|---|---|---|
| 1 | 2 | H | 6 | 600 |
| 2 | 2 | I | {Side 5} {Bottom 30} | 864 |
| 3 | 100 | J | | 800 |
| 4 | 100 | J | | 1100 |

**TABLE III—MOLD AND YEAST** Are Present In Unused Bags

| Sample No. | Capacity Bag (Lb.) | Manufacturer | Bacteria | No. Per Bag: Mold | Yeast |
|---|---|---|---|---|---|
| 1 | 100 | K | 16 | 50 | 0 |
| 2 | 100 | B | 12 | 50 | 0 |

**TABLE IV—MICROORGANISMS** on 2-In. Sections of Bags

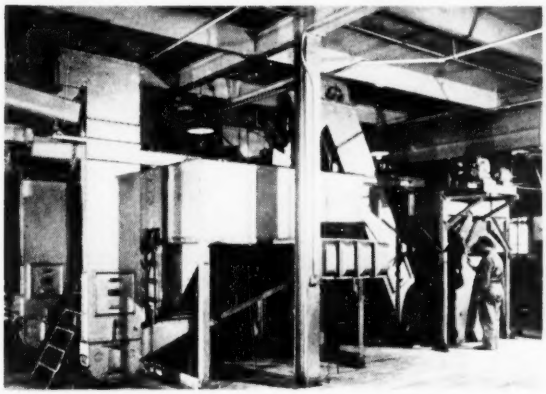
| Sample No. | Mold (Per 2 Sq. In.): Bottom Side | Bottom Side | Middle Side | Yeast (Per 2 Sq. In.): Bottom Side | Bottom Side | Middle Side |
|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 3 | 2 | 1 | 6 | 0 |
| 3 | 5 | 0 | 1 | 0 | 0 | 0 |
| 4 | 1 | 0 | 2 | 0 | 0 | 0 |

**TABLE V—BAGS CONTRIBUTE** Significant Numbers of Microorganisms to Their Contents

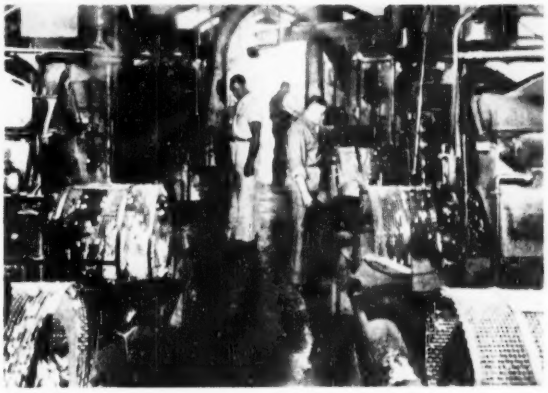
| Sample No. | Sugar Samples (10 G.): Mold* | Yeast* | Sugar Transferred to New Bags and Re-Analyzed: Mold* | Yeast* |
|---|---|---|---|---|
| 1 | 6 | 2 | 16 | 0 |
| 2 | 4 | 0 | 14 | 20 |
| 3 | 8 | 0 | 34 | 0 |
| 4 | 20 | 0 | 20 | 2 |
| 5 | 16 | 6 | 32 | 2 |
| 6 (Sugar 1) | 6 | 2 | 16 | 2 |
| 7 (Sugar 2) | 4 | 0 | 18 | 0 |
| 8 (Sugar 3) | 1 | 0 | 8 | 0 |
| 9 (Sugar 4) | 2 | 0 | 16 | 0 |

* Per 10 g. sample.

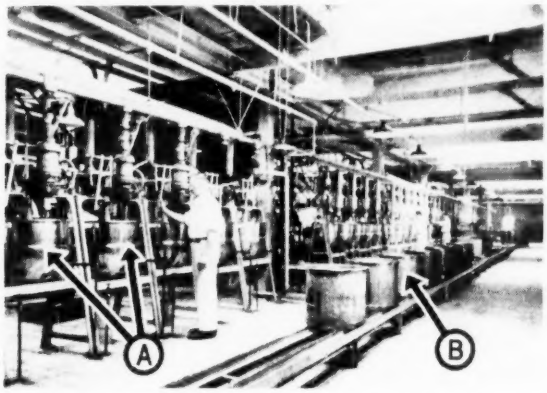
## Cleaning, Popping, Syrup-Coating Corn for Cracker Jack



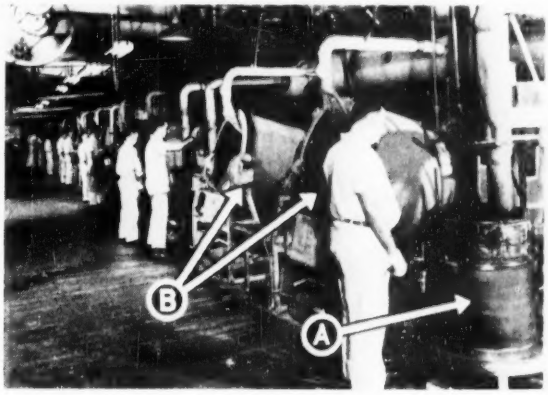
**SERIES** of conveyors carries shelled popcorn from storage silos, past magnets, and into pneumatic cleaner.



**IN THESE** popping machines, corn is tumbled, heated, and exploded to about 28 times its original volume.




**SYRUP** is cooked in stainless steel kettles (A), then added to popped corn in bowls (B) on conveyor.




**MIXER** (A) coats syrup on popped corn-peanut mix. Reels (B) cool and screen out lumps of kernels.

# Engineers Keep Price at 5c

Size and quality of Cracker Jack package remain same . . . Higher costs offset by improvements in handling, sealing, processing, and packaging

**WILLIAM R. HOLTZ**
Chief Chemist, The Cracker Jack Co., Chicago

It hasn't been easy. But the Cracker Jack Co. has continued to manufacture profitably its famous confection without raising the 5c price, shrinking the package, or omitting the popular premiums.

To achieve this has required considerable advanced food-plant engineering in our Chicago plant. We have had to attain higher efficiency in each major operation, without sacrificing product quality.

We also are using a new variety of popcorn which expands to nearly 50 percent greater volume. A word here on its growth: This new hybrid popcorn is noted for much higher yields—up to 2,100 lb. per acre. Formerly used open-pollinated varieties produced only 750 lb. per acre.

Notable changes have improved (1) our materials handling, (2) popcorn popping, (3) ingredient scaling, (4) syrup coating, (5) cooling, (6) premium wrapping, and (7) packaging operations.

Each change will be detailed in production-line order:

### 1—Materials Handling

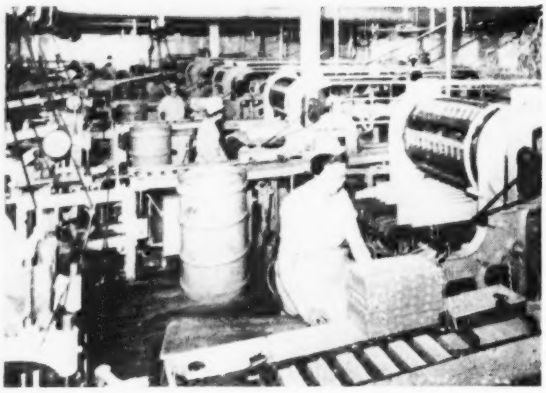
Much has been done to improve materials handling. Corn syrup is delivered to the plant in 8,000-gal. tank cars, equipped with steam coils for heating the syrup to a free-flowing consistency as it is pumped into four storage tanks, each holding 1½ tank-car lots.

A thermocouple is inserted through the dome of each incoming tank-car shipment of syrup. Connected to a potentiometer controller, this instrument automatically regulates the amount of steam running through coils in the tank car to bring the material to the right temperature for handling. And storage tanks are located in a room where the temperature is constantly kept at 100 deg. F.

Molasses is also shipped in tank

## Wrapping Premiums . . . Coating Cartons

SPECIAL rotary-type machine wraps 260 favors per min. in pressure-sensitive paper.



DIPPING UNITS (top, right) wax-coat Cracker Jack cartons, which are then overwrapped with waxed paper.

cars, from which it is pumped into four 55,000-gal. tanks.

The Cracker Jack syrup is prepared in two 550-gal. stainless steel, steam-jacketed tanks. Sugar, corn syrup, molasses, and water are all blended with a horizontal-type agitator. While the finished syrup is batched off from one tank, another batch is prepared.

The syrup is now pumped into a 550-gal. holding tank. From here, it is continuously recirculated to 42 stainless steel kettles (40-gal. each) with U-shaped, vertical agitators. Each kettle is equipped with an overhead volumetric measuring device that automatically delivers 20 lb. of syrup into the cookers. Temperature of the syrup is automatically maintained at 170 deg. F. during recirculation to keep it free-flowing.

Batches of syrup for coating the corn are cooked to 300 deg. F. Heating the syrup to this temperature takes about 10 min. and one attendant handles four batches at a time.

Bulk-shipped to the plant in box cars, raw popcorn is unloaded into a receiving hopper by a power shovel. From here, movement is automatic.

A bucket elevator lifts the corn to horizontal screw conveyors feeding six concrete silos, each holding 275,000 lb. From the cone-bottomed silos, horizontal screw conveyors and a bucket elevator move the corn past stationary magnetic separators and into two pneumatic cleaners.

### 2—Popping the Corn

From the cleaners, horizontal screw conveyors feed the raw corn to chutes supplying 20 machines that pop the corn to about 28 times its original volume. Moisture content of the popped popcorn is 13-14 percent.

These special popping machines comprise a supply hopper and a three-section rotary screen for preheating, popping, and cooling the corn. Inside each screen are horizontal vanes that insure efficient tumbling of the corn during popping and cooling.

About 75 lb. of raw corn is chuted into a volumetric measuring device. The required amount of popcorn is then charged into the gas-fired preheating section, where it is heated to 300 deg. F. for ½ min. The warm corn continues to the gas-fired popping section. As the corn is tumbled, it is heated to the popping point. Both the gas-fired rotary preheating and popping screens are enclosed.

Popped corn now goes to the outer rotary cooling section. The rotary cooling screen separates the unpopped from the popped corn. A 1,750-rpm. exhaust fan attached to the screen removes heat and smoke from the poppers. Each popper handles 160 lb. of raw corn hourly.

Unpopped corn drops through the outer cooling screen and is sold for cattle feed, while the popped popcorn is pneumatically conveyed to an overhead, enclosed canvas-belt conveyor feeding two 250-lb.-capacity surge bins. A screen installed at the discharge end of the pneumatic system reduces the air pressure, thus preventing damage to the corn at this transfer point.

Automatic gas-blending units have been installed for maximum combustion efficiency in the poppers. There are two units, each operating independently in the event one breaks down. These units regulate air and gas pressures to form a blend that will burn efficiently, thereby saving fuel.

As a safety measure, automatic $CO_2$ fire extinguishers have been installed directly over the two surge bins. In the event hot corn ignites, then $CO_2$ gas automatically puts the fire out with minimum product loss.

Shelled, No. 1 runner-type peanuts —still another ingredient going into the manufacture of Cracker Jack— are automatically cleaned in a Bauer unit comprising a vibrating screen, aspirator, and stoner. Cleaned nuts are then conveyed over an inspection belt, where girls carefully sort out the rejects.

Production of the confection, at this point, is a three-step operation involving volumetric measurement of the ingredients (popped corn and peanuts) into mixing bowls, coating the ingredients with syrup, and then cooling and separating the individual kernels.

Empty, flat-bottomed mixing bowls are fed onto a circular conveyor, mounted about 10 in. above the floor. This conveyor carries the bowls from greasing to ingredient-measuring, syrup-coating, and cooling stations. Installation of this conveying system has simplified handling of the mixing bowls, which were formerly slid across the floor by the workers.

Empty mixing bowls are loaded onto the conveyors at the oil spray station. Using a high-pressure sprayer, a worker quickly coats the inside of each bowl with highly refined corn oil. Oil-spraying of the bowls prevents the coated popcorn from sticking to them.

### 3—Ingredient Measurement

Mixing bowls are now conveyed to the two 250-lb.-capacity surge bins. Each bin feeds the popped corn into three volumetric filling hoppers, each delivering 3.7 cu. ft. of corn into mixing bowls.

### 4—Coating With Syrup

Bowls are then automatically counted as a production-volume check as they continue to the mixing station

—the second step in the process. At this stage, syrup and peanuts are added and each bowl is then removed from the conveyor and inserted into an electrically heated mixer with a vertical, worm-screw-type agitator. Mixers are spaced between every third cooling reel. Syrup is coated on the corn and peanuts during a 3-min. mix.

Raising and lowering of the agitator is merely a matter of pulling a lever that actuates a hydraulic mechanism, operating under 40 psi. Formerly, this task was carried out by a manually operated counterweight system.

### 5—Cooling the Product

Separating the mass of syrup-coated corn into individual kernels and then cooling them comprise the third step. Each bowl is now removed from the mixer and dumped into an open-face reel, equipped with baffles and rotating at 12 rpm. By rotating and blowing warm air onto the batch, the lump of confection is gradually cooled and separated into individual kernels. Warm air is duct-fed to the top of each reel.

The cooled batch is discharged onto a vibrating screen that separates kernels from small lumps. Lumps are retained in the cooling reel, and the kernels pass through the screen to the floor below ready for packaging in an air-conditioned room (72 deg. F. and 40 percent relative humidity).

### 6—Premium Wrapping

The new premium-wrapping line is another contribution to higher productive efficiency.

Each metal or plastic novelty is individually wrapped—for two reasons: (1) To aid the consumer in easily locating the novelty, and (2) to prevent his accidentally putting it into his mouth along with the confection.

Three wrapping machines are employed—one (a standard machine) for the bulkier premiums, and two (special rotary type TAB units) for the flat objects. Formerly, about 70 operators hand-wrapped the premiums. But now, with the changeover, only 5 girls are required in the semi-automatic wrapping of the favors.

Bulky premiums are wrapped at the rate of 60 per min. Prizes are hand-fed to this machine, which automatically wraps and seals them.

Working on each of the special wrapping units, two operators insert premiums into compartments on a turntable. These items are then automatically transferred to a vertical, rotating, compartmented wheel, which deposits them onto roll-fed, pressure-sensitive paper.

As the paper travels forward, a top web of similar paper is fed from another roll and positioned directly over the equally spaced novelties. Top and bottom webs then go to the sealing station, where two pairs of rolls make a pressure seal on all four sides. A rotary knife cuts the double web, and the wrapped premiums continue to a canvas-belt conveyor to be mixed by hand. Each machine wraps 260 prizes per minute.

### 7—Packaging

Operations on the packaging lines have been streamlined, too. On every line, empty cartons are fed from a magazine onto a sprocket-chain conveyor. As the cartons move along, they are turned rightside up, and a wrapped premium is inserted into each. Next, a volumetric machine accurately measures the required amount of Cracker Jack into the cartons, which continue to a vibrating belt.

Here, the product settles down in the cartons to make a tight pack. Carton flaps are then automatically sealed, and the packages are turned on their side.

Cartons now go to a company-built underfill detector. This unit features a pressure-sensitive roller that rides over the cartons. If a carton is slack-filled, the roller depresses the side and in so doing drops down enough to actuate a bar which ejects the lacking package from the line.

Triple package-protecting operations follow. First, the cartons are machine-wrapped with heavily waxed paper, which is then heat-sealed.

Second, ten cartons are conveyed, in a row, to a company-designed wax-dipping machine, where they are lowered into melted wax. Cartons are secured by gripping fingers as they go into the 170-deg. F. wax (only half of each carton is wax-dipped in this initial movement). Next, the cartons are automatically inverted and the other half is dipped into the wax to complete the operation.

Third the waxed cartons are then machine-wrapped with still another heavily waxed, printed paper.

This triple protective-packaging technique is employed because this confection is extremely hygroscopic. It must, therefore, be adequately protected to prevent moisture penetration and subsequent lumping of the product.

Finally, the cartons go to an adjustable case packer that loads 50 or 100 cartons to a shipping case. Adjustment of this machine is simple. It merely requires changing pusher bars and the case-feeding magazine.

Worthy of note is our company's paper-waxing operation. To assure product protection, the paper is heavily waxed, using 35 lb. of wax per ream.

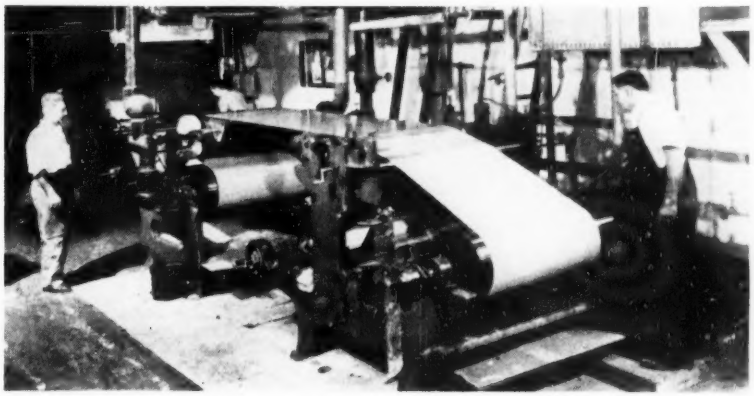
Wax-coating of the paper is carried out this way:

Ten-pound slabs of refined paraffin (133-135 deg. F. melting point) are dumped into a vat equipped with steam coils. The wax is melted and then fed to a Mayer coating machine, where roll-fed newspaper stock is immersed in a trough containing the melted wax. The wax-coated paper then travels over a brine-refrigerated roll, and it is finally slit to size.

Close attention is paid to quality control at The Cracker Jack Co. A running check is carried out by the laboratory on all incoming raw materials used in the manufacture. Samples of raw material are examined for evidence of foreign matter and checked for adherence to specifications.

As a further safeguard, all processing steps are constantly checked by the laboratory. In this way, product uniformity is maintained.

As a final check, samples of each day's production are picked up by the laboratory and subjected to both normal and accelerated shelf-life tests.



THIS IS unit that wax coats heavy paper used as carton overwrap.

JUDGING vanilla-flavored cakes, taste panel finds new synthetic superior to other vanilla-like flavors.

# *Better* Artificial Vanilla Flavor

New synthetic is termed "closer to natural" . . . Of high strength, it cuts costs, also "rounds out" qualities of other flavoring agents

**CORNELIA A. TYLER**
Foster D. Snell, Inc., New York City

A new flavoring agent—propenyl guaethol*, which is highly notable in its resemblance to vanilla—is now available.

And in certain combinations with other synthetics, it actually creates superior qualities hitherto deemed impossible in these artificial materials.

Because its flavor strength is very high, its cost at use levels is less than that of vanillin or ethyl vanillin. It can, therefore, be used for the double purpose of improving synthetic vanilla flavors while also reducing their cost.

In combination with other types of flavors, it has synergistic properties that emphasize the character of many sweet flavors, such as chocolate, maple, butterscotch, fruit, and also of many bland flavors, such as cocoanut and butter cream.

Vanilla is a popular flavor for many types of foods. Hence, repeated efforts have been made to produce combinations of less costly ingredients which approach the flavor quality of the extract of vanilla beans—the natural flavor.

Many types of artificial vanilla flavor are used. All meet a need for a vanilla-like tone in those food products which do not permit the expense of using the expensive, true extract. These artificial flavors are not only less costly, but they are also of uniform and reproducible quality (since they consist of pure chemical compounds instead of natural blends).

Principal vanilla substitutes are vanillin, ethyl vanillin, and coumarin—used either alone or in combination.

Such synthetics have come into widespread use, and consumers in great numbers find them satisfactory. There are, however, those others with discriminating palates, who prefer the natural extract and are willing to pay more for ice cream, fancy cakes, and other specialty food products flavored with true vanilla.

Accordingly, an extensive search was made for a new, less expensive flavoring agent which would appeal to the discriminating palate. Outcome was the discovery of this new synthetic flavoring compound—propenyl guaethol—a white powder. In addition to its aforementioned benefits as a vanilla extender or replacement, it also prolongs the taste sensations in gums and other candies where flavor persistence is important.

The new agent was evaluated in our laboratories on the basis of its strength and the quality of its aroma and flavor, by a trained organoleptic panel. For comparative purposes, natural vanilla extract, vanillin, ethyl vanillin, and coumarin were employed. Based on the results, various combinations of natural vanilla and synthetics, also synthetics alone, were evaluated in food products.

### Judging the Equivalents

Flavor-strength equivalents were determined by standard organoleptic methods at: (1) Detection-threshold level (lowest concentration at which

* Produced by Fine Chemicals, Division of Shulton, Inc., and sold under the brand name, Vanitrope.

flavor can be detected when compared with distilled water); (2) identity-threshold level (lowest concentration at which an aroma and a flavor can be identified); and (3) use level (a concentration typical of the range for consumer use).

Results were obtained by direct comparison and by the duo-trio technique. In the latter method, aim was to choose the correct sample from a series of three coded samples, in which two were alike and one was different. Three experienced judges were selected because of their previously established high acuity in detecting small differences in vanilla-flavored foods.

The relative strength values at the use level (see Table I) are expressed in terms of vanillin (as the base). Compared with vanillin crystals, ethyl vanillin and coumarin are 3 times as strong and propenyl guaethol 20 times, whereas vanilla extract is about 1/150 the strength. The commercial extract was previously selected by the panel as of excellent quality.

Equivalent strength figures furnish a scientific basis for determining the amount of a flavoring agent to use. They also indicate the low concentration in which propenyl guaethol is satisfactory—as compared with other agents.

A word of caution: Excessive amounts of propenyl guaethol must be avoided, otherwise, an unpleasant medicinal taste occurs.

## Costs and Flavor Strengths

Equivalent costs of the flavoring agents, as related to the price of vanillin, are also included in Table I. These figures show the importance of determining, with some degree of precision, the quantities of flavoring agents needed in foods relative to actual costs.

Flavor strength evaluations furnish a basis for finding the proper amount of alternative agents to use and thus obtain good results at minimum cost. For practical use, the equivalent costs, by flavor strength (Table I), are the significant cost figures.

## Borne Out by Panel

The panel confirmed the generally accepted equivalent strengths of ethyl vanillin and coumarin—that is, three times that of vanillin in the use-level range. It is also generally accepted that a 0.7 percent vanillin solution is equivalent in flavoring strength to 100 percent 1-fold vanilla extract. This was also confirmed by the panel evaluation.

Foods effect the tone of a flavoring agent in different ways. For example, synthetics have a closer resemblance to natural vanilla when evaluated in milk

(*Turn to page 190*)

# Guaethol Takes Cost, Quality Tests "In Stride"

**TABLE I—COMPARISON** of Equivalent Strengths and Costs of Flavoring Agents

| | Vanilla Extract | Vanillin | Ethyl Vanillin | Coumarin (Crystalline) | Propenyl Guaethol |
|---|---|---|---|---|---|
| Equivalent-flavor strength | 0.007 | 1 | 3 | 3 | 20 |
| Equivalent-flavor strength in laboratory units | 14.3 liters | 100g. | 33g. | 33g. | 5g. |
| Equivalent-flavor strength in commercial units | 140 oz. | 1 oz. | 1/3 oz. | 1/3 oz. | 1/20 oz. |
| Approximate current price | $8.00/gal.<br>$0.07/oz. | $7.00/lb.<br>$0.19/oz. | $6.75/lb.<br>$0.42/oz. | $2.94/lb.<br>$0.18/oz. | $27.00/lb.<br>$1.70/oz. |
| Equivalent costs by flavor strength in terms of 100g., or 3.53 oz., of vanillin | $32.00 | $0.66 | $0.50 | $0.20 | $0.30 |
| Equivalent costs by flavor strength in terms of 1 oz. of vanillin | $9.00 | $0.19 | $0.14 | $0.06 | $0.08 |

**TABLE II—VANILLA-FLAVORED** Hot Chocolate, Frosting, and Cake Compared on Basis of Flavor and Aroma Values and Equivalent Costs of Flavoring Agents

| | Form. 1 (Natural Vanilla Extract (1-fold) | | | Form. 2 (Vanilla-Vanillin) | | | Form. 3 (Vanilla-Ethyl Vanillin) | | | Form. 4 (Vanilla-Propenyl Guaethol-Vanillin) | | | Form. 5 (Vanilla-Propenyl Guaethol-Ethyl Vanillin) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parts used (in terms of flavor strength) | 100 | | | 50:50 | | | 25:75 | | | 10:45:45 | | | 10:45:45 | | |
| Foods used* | H | F | C* | H | F | C | H | F | C | H | F | C | H | F | C |
| Aroma rating | 4.0 | 4.0 | 4.0** | 2.9 | 3.3 | 3.5 | 3.6 | 3.6 | 3.8 | 3.6 | 3.8 | 3.8 | 2.5 | 3.1 | 3.6 |
| Flavor rating | 4.0 | 4.0 | 4.0** | 3.1 | 3.3 | 3.5 | 3.5 | 3.6 | 3.8 | 3.6 | 3.6 | 3.8 | 2.9 | 3.2 | 3.6 |
| Equivalent cost by flavor strength (in terms of 100g. or 3.53 oz. of vanillin) | $32.00 | | | $16.33 | | | $8.40 | | | $3.64 | | | $3.56 | | |

* H represents hot chocolate, F frosting, and C layer cake.

** Overall rating (closeness to natural vanilla): Excellent, 4; very good, 3.5; good, 3.0; fair, 2.5; fairly poor, 2.0; poor, 1.5; very poor, 1.0.

**TABLE III—VANILLA PUDDING DESSERTS** Compared on Basis of Aroma and Flavor Values and Equivalent Costs of Flavoring Agents

| | Form. 1 (Natural Vanilla Extract) | Form. 2 (Vanillin-Ethyl Vanillin-Coumarin) | Form. 3 (Propenyl Guaethol-Vanillin) | Form. 4 (Propenyl Guaethol-Ethyl Vanillin) |
|---|---|---|---|---|
| Parts used in terms of flavor strength | 100 | 49:49:2 | 50:50 | 50:50 |
| Aroma rating | 4.0* | 2.5 | 3.4 | 2.7 |
| Flavor rating | 4.0* | 2.7 | 3.4 | 3.1 |
| Equivalent cost by flavor strength (in terms of 100g., or 3.53 oz., of vanillin) | $32.00 | $0.57 | $0.48 | $0.40 |

* Overall rating (closeness to natural vanilla): Excellent, 4.0; very good, 3.5; good, 3.0; and fair 2.5.

**TABLE IV—COST** of Propenyl Guaethol as Used in Various Foods, With or Without Vanillin

| Kind of Food | Quantity (Lb.) | Quantity of Propenyl Guaethol (Powder Oz.) | Quantity of Propenyl Guaethol (4% Sol. Oz.) | Quantity of Vanillin (Oz.) | Approx. Cost of Flavors Listed |
|---|---|---|---|---|---|
| Light choc. coating | 1,000 | 5/8 | | | $1.06 |
| Dark choc. coating | 1,000 | 5/16 | | 2 3/8 | 0.98 |
| Choc. fudge | 1,000 | | 12 1/2 | | 1.38 |
| Assorted flavor fond. | 1,000 | | 6 1/4 | | 0.69 |
| Vanilla ice cream | 10* | | 1/4 | 3/8 | 0.10 |
| Choc. cake or cookie dough | 1,000 | | 12 1/2 | | 1.38 |
| Other flavor cake or cookie dough | 1,000 | | 6 1/4 | | 0.69 |

* Gallons

Note: These are the calculated unit-material costs—Propenyl guaethol (powder), $1.70 per oz.; vanillin, $0.19 per oz.; Tween 80 SD, $0.66 per lb., $5.45 per gal., $0.04 per oz., 4 percent solution of propenyl guaethol in Tween 80 SD, $0.11 per oz.

### There's Still Gold There

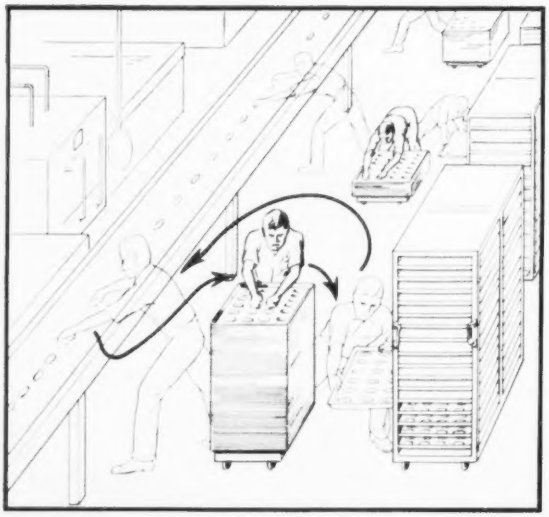
**These days, minds everywhere are raptly attentive to means of mechanization.**

**Which is as it should be.**

**But wise food operators—like F. S. Virnelson, Jr. (whom you'll read about here)—don't let this fact obscure the manual phases of their food processing. They know plenty of the work is still dependent on hands today—and will be tomorrow.**

**In short, there's still gold in the manual operations—for those planners who continue to put their minds on "producing the most for the least expenditure of energy" . . . as is most pertinently borne out in this pointed time-motion article.—*The Editors***

**"Wasteful gyrations" . . .**



OLD WAY required 14 men, dissipated their efforts.

## From Motion-PLUS, Output-Minus to—

# *Motion-Minus—Output-PLUS*

T-M changes cut excessive, fatiguing action out of Eastern baker's roll-panning operation. And new procedure maintains top production rate with less than 1/3 old number of workers

**IVAN C. MILLER**
Assistant Editor, "Food Engineering"

**Those dizzy, pendulum-like motions that the workers went through in filling the pans on the bun-and-roll lines . . . !**

Such gyrations just didn't make sense to Production Superintendent F. S. Virnelson, Jr., of Virnelson's (formerly Mees') Bakery in Philadelphia. And the more he watched the men, the more he was convinced that here was a whole operation millstoned by waste motion—unnecessarily fatiguing to the workers and excessive in use of their costly time.

Further, he reasoned that just because it had "always been done that way" didn't prove the method either efficient or practical.

Upshot was that something was done about it. A time-motion study was conducted and the findings forthwith applied.

**Result: Today, 4 workers on one line turn out a volume of production which formerly required 14 operators working on two lines.**

Nor is that all. Now, at the end of a shift, workers remain physically much fresher, less tired, than before. In addition, product quality has been improved. And needed floor space has been made available for other production activities.

### Pinning Down the Trouble

In the old method, the 24-compartment pans, in which rolls and buns are baked, were first greased, then stacked on small 4-caster hand-trucks. These were rolled into position at the side of a conveyor carrying dough from the molder. Rolled up on the opposite side of the stack of trays were racks on which filled pans were stacked for transfer to the proofers.

To load dough into pans, workers stood by a stack of trays, side stepped and reached over to the conveyor (a 60-in. stretch), removed four pieces of formed dough (two in each hand), and, returning, dropped them into pan depressions.

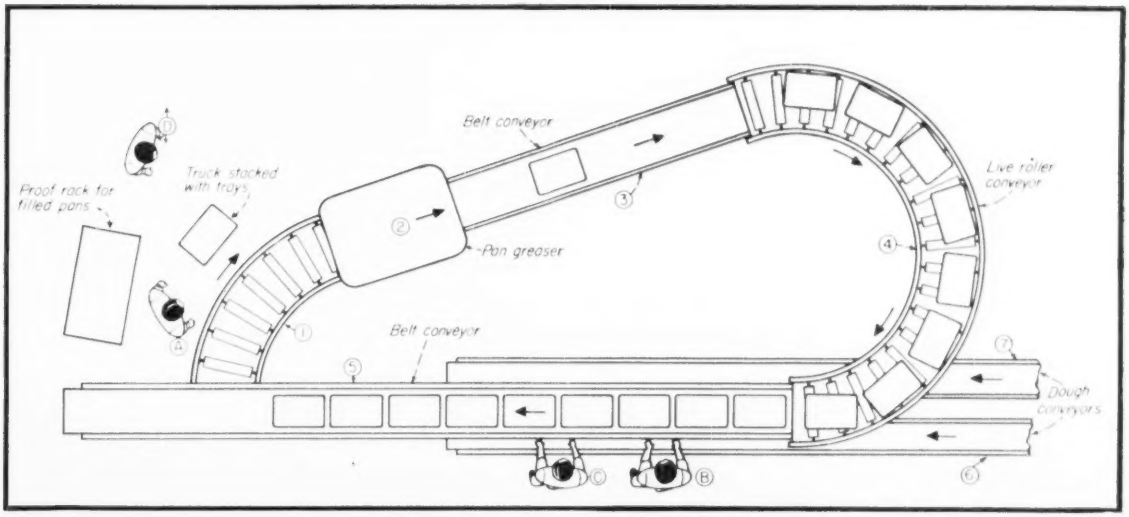
Repeating the side-step, pick-up, return-and-drop operation six times, served to fill one pan. Then, loading the pan onto the rack required another side step and reach of 48 in. and return before starting to fill the next pan in the stack.

All together, the motions added up to a total of 68 ft. filling and transferring just one pan. And not only did the workers move from side to side, but they also moved up and down as well. Height of the stack of pans kept varying—from too high for the workers at the start to far too low for them long before the truck was empty. The rack filling also required a long stretch up to fill upper layers and a cramping stoop to fill bottom section.

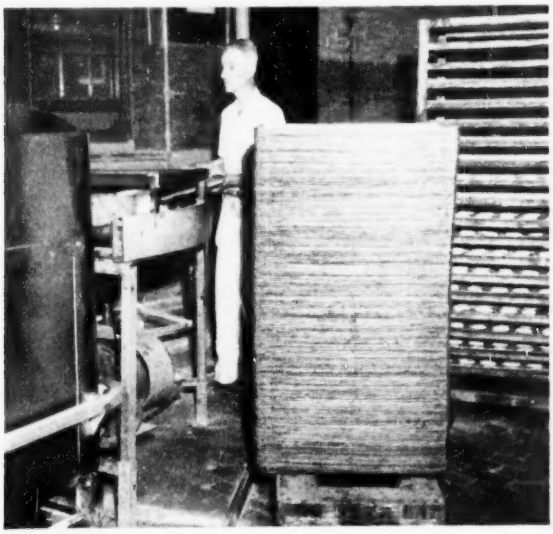
One other element of the old panning method was objectionable. Since it was necessary that pans be greased before filling, it was impossible, due to the transfer operation, to keep grease off the hands, and to prevent the consequent transfer of grease from hands to dough. Quality of the baked goods suffered.

For maximum speed with minimum worker fatigue, the time-motion study dictated one change as primary: Pan-

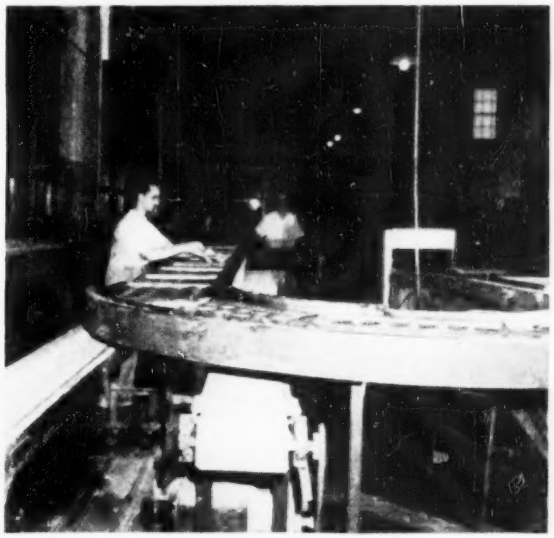
## . . . were abolished by this "P" plan



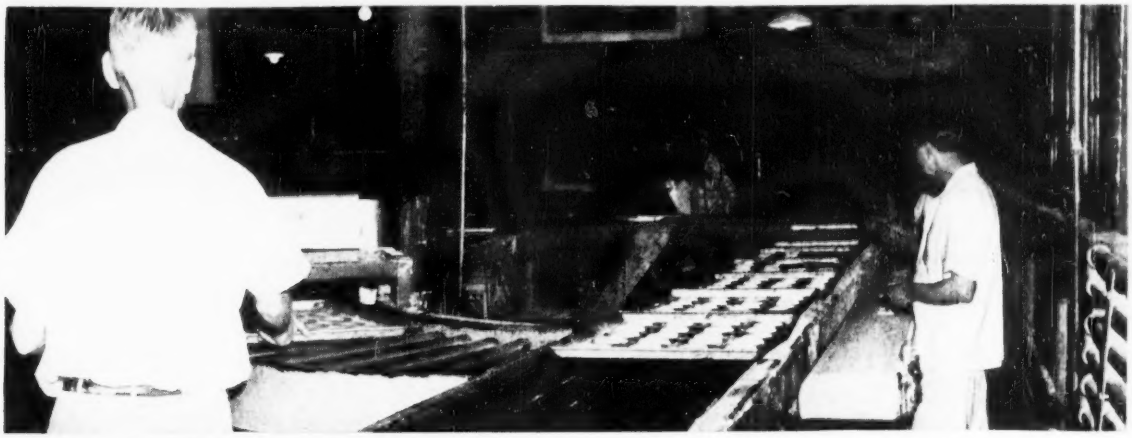

**NEW SETUP** takes but 4 men. Letters indicate operators, numbers equipment (see text for details).



**OPERATOR** feeds pans from stack in foreground to greaser, places filled pans in proof rack at right.



**PANS** move to filling stations at speed exactly synchronized to receive volume of dough from molder.



**OPERATOR** seen at left shifts pans, does not touch dough. Filling operators (right) do not touch greased pans.

ning should be accomplished without any side stepping or body bending and with least possible movement of hands.

This meant delivering the dough to the workers in measured amount and at the most convenient height. It also meant bringing up the pans at a rate synchronized with the flow of dough. Furthermore, it was necessary to deliver the pans, in line, to the panning station, and also as close to the dough conveyor as possible.

Parallel, closely adjacent travel of the two lines was essential for minimum hand movement during filling. Accurate synchronization was necessary to maintain production rate with least number of cripples.

### How It Was Done

Here is the way the equipment was arranged to reduce panning operators' movements to approximately one-fifth of former requirements, and also eliminate handling of greased pans by those who filled them with dough:

Laid out was a conveyor arrangement formed similar to the letter "P" (see sketch). Operator (A) stands between a stack of clean, empty pans and a mobile rack on which pans are placed after filling. Alternately, (A) places an empty pan on roller conveyor (1), and removes a filled pan, stacking it on the proof rack. Another worker (D) brings up stacks of pans and pushes racks to proofers. Empty trays are fed by the conveyor into an automatic pan greaser (2), from which they are discharged onto belt conveyor (3).

Each pan is pushed along the semicircular live rollers (4) by powered rollers. At the end of this travel, trays are picked up by the belt of conveyor (5), along which are stationed the pan-filling operators (B) and (C).

### Exact Timing Required

Arriving on belt conveyor (6), dough from the molder is transferrred to the pans by hand, a movement of not over 14 in. each way—total per pan now less than 14 ft.

Five variable speed drives are essential, in the company's normal operations, to get exact synchronization of all moving units of the assembly. If cut-and-formed dough moves to the pan-filling stations proportionately faster than the trays, the number of cripples will mount. On the other hand, if speed of the dough conveyor is too slow, only partly filled pans will go to the proofer, and production rate will drop. Therefore, speed of the dough-forming machine must conform exactly with speed of the tray-bearing belt passing the filling stations.

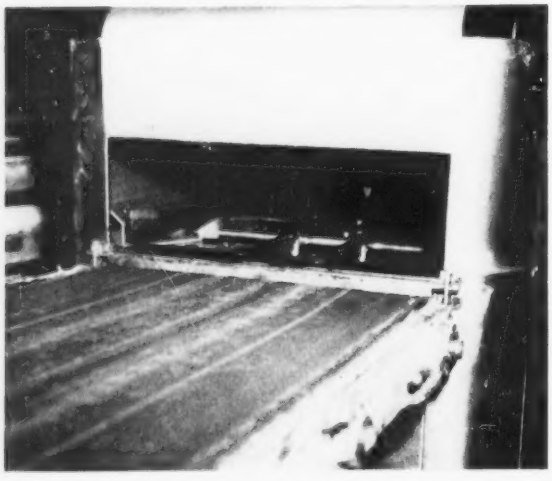
Though speed of dough-bearing belt (6) is also governed by a variable speed control, changes of belt speed vary the space between pieces of dough but not the rate of delivery to the filling stations.

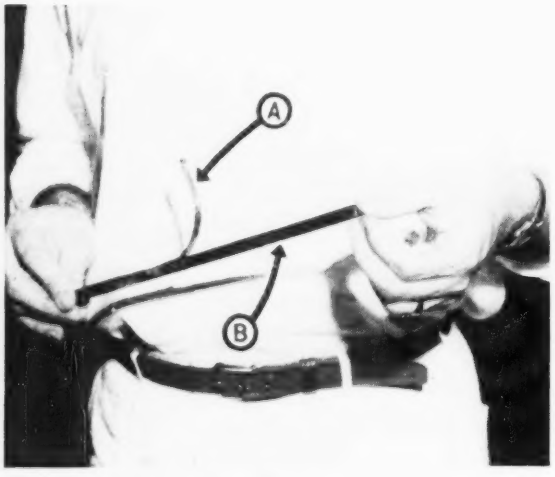
Conveyors (3) and (4) are variable speed controlled and likewise the pan greaser (2). Rate of travel of pans through the latter determines extent of greasing. For details of how a bread greaser was converted to a roll greaser see accompanying special panel.

A sixth variable speed control is only used when there is a call to increase production above the normal 144,000 roll per-hour rate. In this event, dough belt (7) is operated to supply two additional pan-filling operators, stationed on the opposite side of conveyor (5) from (B) and (C). Then, by doubling the speed of pan delivery, production rate can be doubled. Output of 6 operators is then twice as much as the production volume of 14 workers on the two lines formerly used. Space requirements are less and quality of finished product is much improved.

Since the two pan-filling operators no longer transfer filled pans to proof racks, and since they need employ only minimum, simple movements to load the trays, their work is now less tiring, yet their production rate has been greatly multiplied.

## Simple Devices Turn the Trick






### Bread-Pan Greaser Adapted for Rolls by Simple Addition of a Spring

Merely by welding a length of properly shaped spring steel to the trigger of the grease spray control, a bread-pan greaser was converted into an efficient unit for greasing pans for rolls.

When the greaser (left photo) was used for bread pans, trigger of the grease spray control was tripped by contact with the flat bottom of the pans as they were conveyed through the unit. Roll pans are made with 24 depressions, with space around each. So, when the area between the cups in the roll pans passed over the trip, no grease was sprayed on the trays.

To insure 100 percent tripping of the grease-spray control by roll pans as they passed through the grease, a length of spring steel—(A) in right photo—was welded on the upper side of the trip-bar (B). Now, even if the area between pan depressions passes over the trip, the spring is engaged and the trip is thus actuated to operate the grease sprays.

# Plant Power Pinch *Ended by* High-Voltage Setup

Thus, Philadelphia packer blocks chronic threats of production stoppages and food spoilage . . . Also reduces cost of current

**FE STAFF**

To counter growing electric-power difficulties, John J. Felin & Co., Philadelphia meat packer, boldly switched to current of much higher voltage. And though this shift to high-tension lines required installation of a costly substation, results readily justified the move.

Advantages were immediate—

**1. Assurance of required power at all times, without fear of interruption or failure and consequent loss of production or product spoilage.**

**2. A material reduction in cost of power, speeding amortization of the outlay for the substation.**

First step toward this operational safeguard and power cost economy was taken when two 2,400v. lines were initially brought into the plant, one for regular load, the other an emergency standby. These provided current for three 175-hp. refrigeration compressors and three motor-generator sets for converting from a.c. to direct current.

Current for the rest of the plant was distributed through transformers—two of 200 kva. capacity, two of 150, two of 100, and two of 15. The latter two are for plant lighting only.

As the company's power requirements increased, so did the demands of other customers on the lines, until overloads became frequent. Thus were caused the failures that not only disrupted production but also impaired quality.

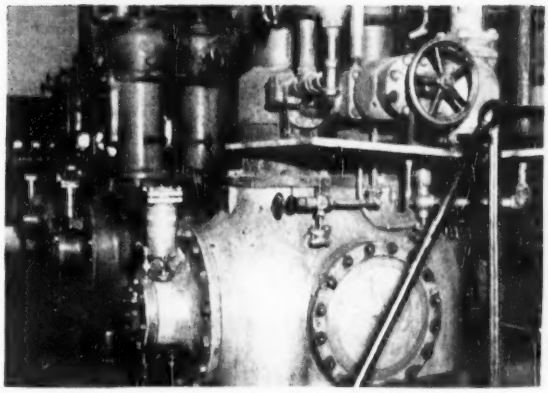
Then expansion requirements called for addition of a fourth refrigeration compressor driven by a 200-hp., 2,400v. motor. This unit now supplied refrigeration for a 2,400-hog capacity chilling room.

That added power call meant something drastic *had* to be done for surety of the power operation at Felin's. And it was—by making a shift to two 13,200v. lines and accompanying installation of the company's own substation (see photo).

Latter consists of two separate sections, each one with meter room and two 667 kva. transformers between 13,200v. and 2,400v. lines. Only one high-tension line is in use at a time. The other, serving as a standby, is automatically cut in, however, in event of failure of the line in use. Chance of an overload on either is remote.

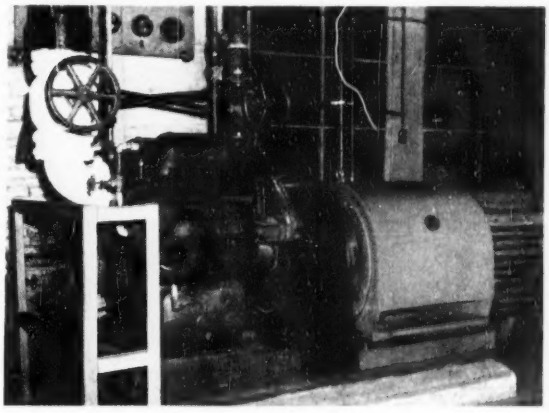
From the 667 kva. transformers, one 2,400v. lead goes to a bus serving the four refrigeration compressors (maximum motor load of which is 725 hp.) and the three motor-generator sets. Maximum motor load of these is 550 hp. However, only one is used at a time. Another 2,400v. line serves the plant motors and lighting circuits via the eight plant transformers previously listed.

Prime objective was dependable and plentiful power, with the cost factor secondary. Yet, the expense is actually proving low, for the goal has been obtained at the cost of a substation which will soon pay for itself through savings in power charges.



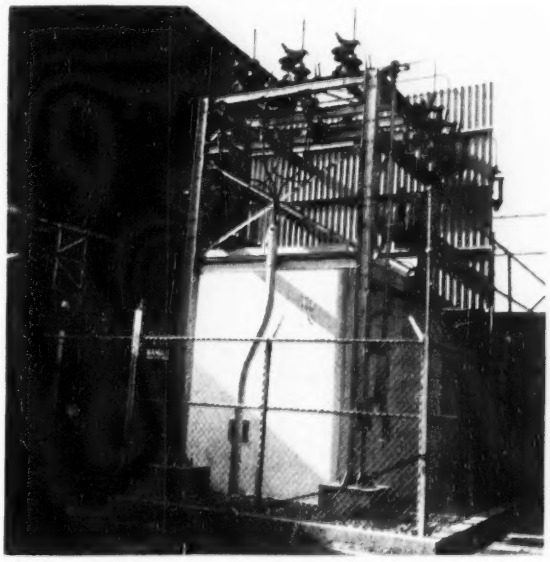
**Set Three Compressors to Work**

. . . and you may, like Felin, so tax your power lines that failures are invited, production menaced.



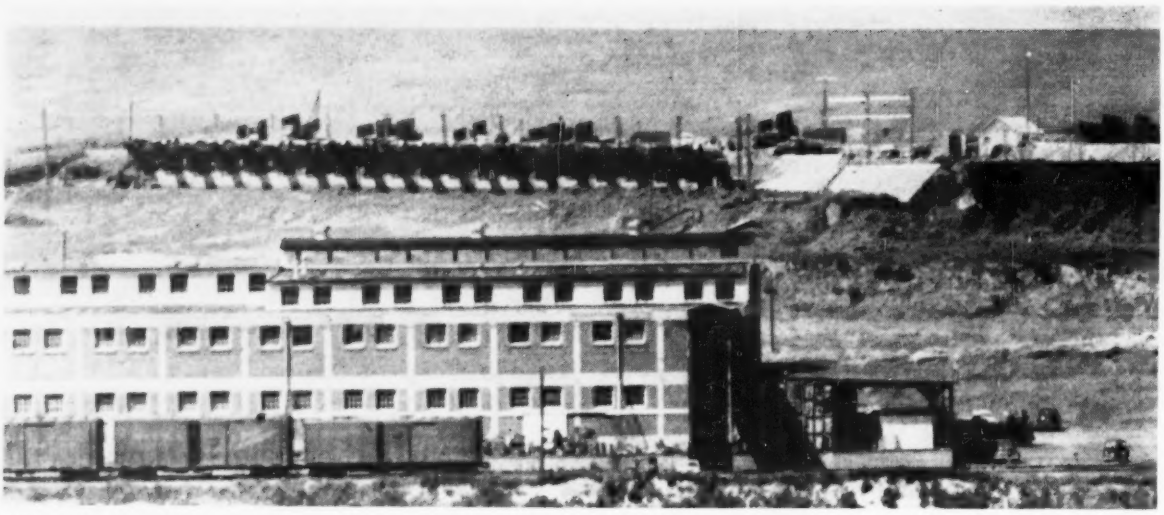
**Add a Fourth**

. . . in such a setup, and you're really asking for Trouble with a capital "T".



***But*—Put in a Substation**

. . . served by high-tension lines—and dependable power is assured, cost factors smoothed, worries over.



OVERALL VIEW indicates size of operation. Vines from fields are delivered in trucks, on two-way radio schedules,

*Sharp Analyzing, Bold Discarding, Modern Reshaping*

*Recreates Pea Plant as—*

# Top-Rank Quick-Freeze Operation

Speed, uniformity, continuous flow mark new process . . . Every step fully controlled — from fields to finished product to low-temperature storage

**PAUL LAMB and C. R. HAVIGHORST**

Respectively, Food Technologist, Lamb-Weston, Inc., Weston, Ore.; and Associate Editor, "Food Engineering"

When Lamb-Western, Inc., got ready to transform its Weston, Ore., canning operation into its second quick-freeze plant—with standby canning facilities—the master plan incorporated every available modernization in the handling and freezing of peas.

President Gilbert Lamb puts it this way:

**"We overhauled our entire pea-freezing operation beginning with raw materials handling in the fields and ending with low-temperature storage for the finished packaged product. Our procedure was simple—we took each major operation apart and analyzed it for possible improvement; discarded obsolete techniques, methods, and equipment and substituted the most modern; and then designed a processing line in which each single or multiple unit operation was in balance with the planned daily capacity of 176 tons".**

Carrying out the program called for a corps of engineers, in addition to company technologists, to design and put the precisely engineered line on-stream. Years of experience in field and plant operation fitted company men for planning raw materials handling and also for developing specifications for the process. Industrial engineers, drawn from food machinery and refrigeration engineering firms, then designed and supplied equipment to meet these specifications.

## Five Fundamentals

The "disassembled" process and the specifications for efficient re-alignment were reduced to five broad operations:

1. **Improvements in field-to-plant raw-materials handling.**
2. **Development of a balanced process line.**
3. **Selection of quick-freeze units and a refrigeration unit.**
4. **Installation of high-speed packaging facilities.**
5. **Construction of adequate, economic low-temperature storage.**

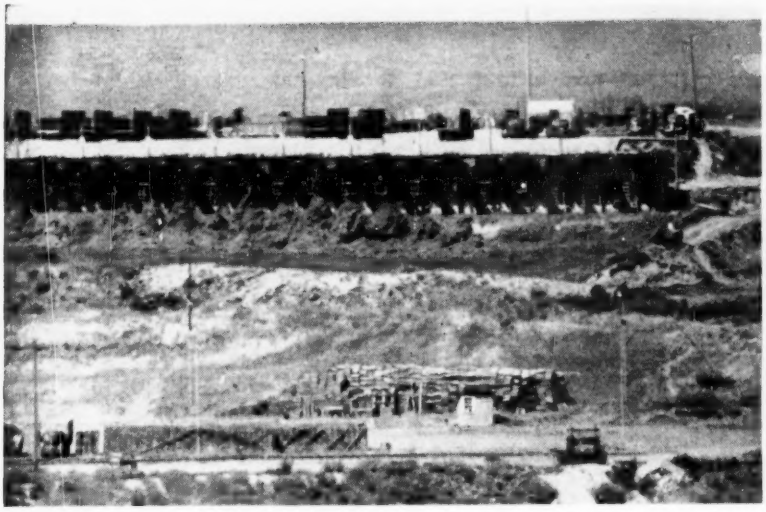
In stepwise fashion, company technologists and cooperating engineers refined conventional methods to control harvesting more efficiently and bring systematic and rapid movement of raw material to the single vining station at the plant.

In this region, peas grown for freezing are about 80-85 percent fancy grade when vined. It remains for freezers to retain this ratio of quality in the finished product. The first operation contributing to quality deterioration in peas is the mechanical action of viners when podding them.

Research by Western Regional Research Laboratory* shows that peas

* "Role of Bruising and Delay in the Development of Off-Flavor Peas," Rachel Cibbits Makower and Alec Collings Ward. *Food Technology* 1950, Vol. 4.

A SPECIAL FE PROCESS REPORT



to long vining station (rear). Peas are flumed to plant (left). Right: President Gilbert Lamb is seen talking to field cars.

are bruised by the vigorous action of viner paddles in this threshing operation. If held in the field or delayed in transit in an ambient temperature of 75 deg. F. or higher, podded peas developed "delay off-flavor". Skin texture and color also deteriorate from the same cause.

### A Look at Old Way

Conventional vining necessitates the temporary installation of viner stations at strategic field locations. Adjacent fields are swathed and the vines hauled to these stations. The podded peas are then caught in lug boxes and trucked to the processing plant—usually a much longer distance than that between fields and viner stations.

The elapsed time (sometimes 2-3 hr. or more) required to thresh a sufficient quantity of peas to make up weight for a truck-load, plus the transport time between field and plant, plus the hazards of delays occasioned by mechanical breakdowns of equipment add up to decisive factors in the development of delay off-flavor—especially in this area where temperatures, during harvest periods, range from 68 to over 100 deg. F.

The first step—improvement of raw-materials handling—aimed at protecting quality and getting greater efficiency and economy. Involved was mechanization and centralization of viner operation. Comprised of 46 viners, the new station is located on a hill directly above the plant and is designed as an integral part of the process instead of being a harvesting operation. Here, after threshing, peas move by conveyor and cool-water flume through the first part of the process within an elapsed time of 6 min. Thus there is no time for quality degradation.

### Radio-Controlled Harvesting

A two-way radio with a sending-receiving radius of 35 mi. adds to harvesting and vining efficiency. The company's fieldmen who, during harvesting periods, appraise the precise time to swath fields, keep in constant touch with each other and with the plant as a means of assuring a uniform, adequate flow of raw material to the vining station. By radio they plan the harvest from day to day—even hour to hour, and keep the 40 3-ton trucks and the several 5-ton trailers on-the-beam between fields and plant.

The radio unit at the plant operates constantly. Conversations carried on by fieldmen give an index to the volume of raw material to be expected at the viner station. Plant slow-downs or break-downs are reported to fieldmen, who then control harvesting accordingly. The trucking company dispatcher is also on this radio hook-up and thus provides sufficient trucks where needed.

### Additional Benefits

Potential growing conditions dictated the size and flexibility of this vining station. Raw throughput capacity is approximately 115 tons/hr. and, if operated at capacity would deliver podded peas at the rate of 23 tons per hr. This would be more than triple the rated capacity of the plant.

Vining, as previously stated, is a unit operation in this process, and the station's flexibility brings another benefit in that throughput volume can be controlled by varying the rate of feed to the viners. If growing conditions for a day, or a succession of days, become ideal and peas are in danger of becoming overmature

---

### "Extra" Project With Ideas Accented

**Here is another of FE's extra-effort presentations bringing readers the fullest working details of an advanced food process.**

**. . . An especially revealing raw material-to-finished product report, coupled with an unusually thorough 4-page foldout flowsheet—both particularly emphasizing outstanding idea-patterns of value to plant operating and technical men in all food branches, as well as top executives seeking facts relative to raising efficiency.**

**THE REPORT (herewith) discusses, step-by-step, how fundamental engineering factors have been brought to bear in the pea-freezing process to gain the utmost in performance and economy.**

**THE FLOWSHEET (pages 118-121) notably keys equipment directly to a comprehensive table covering unit operations, energy balance, and material balance in exceptional detail augmenting the regular photo-design presentation.**

***—The Editors***

(necessitating harvesting in a volume of more than 115 tons/hr.), the viner station can accept an overload. Then by coordinating the rate of viner input with the rate of natural respiration of unpodded peas, and correlating this with plant capacity, the peas are vined before quality deterioration begins and without seriously overloading the line.

Additional economies and efficiencies are: Viner personnel always work at the same pace—need not be transported to various field stations; viners are stationary here—no call to move these cumbersome machines from field to field over highways as harvesting progresses; and since no lug boxes are needed, the original cost as well as box repair costs are saved.

### How Units Work

Viners are arranged in sets comprised of two units. Sets are supplemented with electric hoists equipped with forks and feed regulators. This mechanized materials handling (*Food Industries* Oct. 1948, p. 76) minimizes backbreaking labor and reduces by about 50 percent the number of men required to manually feed viners by pitchfork. With the hoist, one operator can feed alternately each viner in his set with forkloads of 50-100 lb.

As much as 15 tons of vines (5 truckloads) may be dumped at each set and can be reached with the hoist. This provides a reserve of new material for the plant and does not endanger quality of raw material. The feed regulator makes it possible to put heavy loads of vines on the entrance conveyor without overloading the viner. Operating personnel at this station is comprised of 1 superintendent, 5 viner mechanics, and 35 operators.

### Process On-Stream

Centrally located between the two banks of viners is a tunnel in which there are four endless concave belt conveyors leading to the scale-house. Growers' lots are separately handled by different sets of viners, and the flow of peas from each lot is directed, by viner-hoppers, to individual conveyor belts. As one lot is finished and before another is begun, information on the lots is relayed to the scalehouse. Thus, each grower may be credited with his accurate tonnage.

Further evidence of the detailed planning is in the use of concave conveyor belts instead of the much cheaper flume conveying. Belt operation makes it possible to weigh dry instead of wet peas. The labor-saving monitor cleaners operate much more efficiently with the dry product.

At the scale-house, a representative sample of each lot is graded—for tenderness and maturity (with a tenderometer) and for sieve size. And the weight ratio of extraneous material is ascertained. Growers are paid on the basis of these tests.

Peas are elevated from the endless conveyor belts to automatic-recording scales, which alternately weigh, then dump, in 250 lb. lots, into hoppers which feed the cleaners. These are the only holding hoppers in the plant. They provide a uniform flow and a small reserve supply of product. An automatic feeder, at the bottom of each hopper releases a uniform flow to the cleaners, from which cleaned peas drop into cool-water flumes leading downhill to the plant.

When a new line is put on-stream, labor requirements are apt to be higher than after the line has operated a few seasons. At present there are 140 workers in the plant. Along with the 41 workers at the viner station, this makes a total of 181 for each shift.

In-plant quality control begins with the froth-flotation cleaners. Certain weeds, growing in fields in the Northwest, yield flower or seed parts not effectively removed from peas by the previous cleaning units. And, since some of these resemble peas, their removal by handsorting on belts is not satisfactory. Froth-flotation, which also removes pea skins and broken peas, consists of two operations.

Peas, including these undesirables, are first immersed in a "treater" solution, which prepares them for selective bubble-attachment in the froth emulsion. They then drop into the separator tank, filled with this emulsion (oil-in-water and a detergent) and, lacking the buoyancy of the foreign material, peas sink and the extraneous material is carried off by an outlet port.

By gravity, the peas flow in the emulsion through a discharge pipe to a dewatering reel. Thence they go to a flume discharging into a rod-reel washer. Emulsion-free peas drop onto a picking belt. Manual sorting is largely to remove any extraneous material that may be left. Then, peas are flumed to the steam blanchers.

Here, they are steam heated to a 190 deg. F. for 1½ min. to inhibit enzymatic action, expel respiratory gases through product shrinkage, and to set their natural color. Blanched peas are flumed and then pumped up to the next operation—the quality graders.

These units are elevated above the building floor so that the graded product may be flumed direct to dewatering screens (2nd floor) preceding the column freezers, or to the hopper preceding the dewatering bucket-elevator leading to the Marapak carton filler (2nd floor).

Quality graders separate peas on the basis of specific gravity of the individual pea. Thus, peas introduced into the brine solution will, if mature, sink, or will float if of fancy grade. Peas are flumed to a dewatering reel in this unit, then mixed with the brine they flow downward through the central pipe to the center of the separation chamber. Here they are distributed evenly into the center of the relatively quiet brine by a gently operating paddle wheel.

In quiet brine, peas will quickly seek their respective levels, floating upward or downward according to their specific gravities. And, since there are no violent currents or agitation involved, an accurate separation can be made. Floaters, or fancy grade peas, rise upward through the brine and flow through an outlet port into a dewatering reel. They drop from the dewatering reel to short feeder flumes which connect with a system of flumes leading to units preceding the quick-freezers.

Sinkers, the standard grade, leave via the bottom of the grader chamber, are dewatered and chuted to a holding tank. When this tank is filled, they are flumed to one of the column freezers.

Whenever a lot of peas is received that does not require grading, the flume and piping system is so arranged that the quality graders are by-passed and the peas conveyed direct to the quick-freezers.

The making of a brine used to grade 1,000,000 lb. of peas requires about 45,000 lb. of salt. This concentrated solution is prepared on the main floor, then pumped to the brine tanks on 2nd floor, thereby eliminating the transport of dry salt to the brine room. A Foxboro automatic density controller maintains the proper solution in the two graders by automatically adding new solution from the storage tanks when needed.

The flume system, connecting the quality graders with the quick-freeze units, is arranged so that either fancy or standard grade product may be conveyed to the four column freezers. Usually, two of these units are used for freezing fancy grade peas. Only the fancy grade are frozen by the two continuous units.

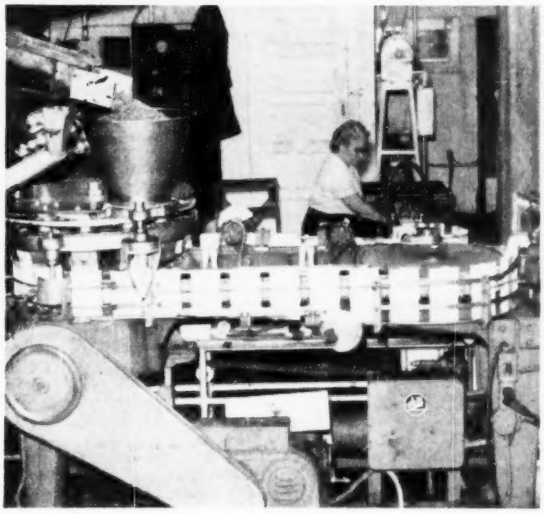
### Freezing Capacity Cited

The main limiting unit operation factor in frozen food production is the capacity of quick-freeze units. This is also the most critical operation in the process. To gain optimum flexibility in the freezing operation, this plant has two continuous package freezers and four bulk-type column freezers.

Total rated capacity of these six

## Flexibility Is Achieved by Two Ways of Freezing

**Some peas are packaged before . . .** **. . . and some are packaged after**



**UNFROZEN PEAS:** Cartons are automatically opened, filled with peas, closed, and go to continuous freezer.

**FROZEN PEAS:** From column freezer, peas move to volumetric filler. Here, 2½ lb. cartons are on line.

quick-freeze units (1½ tons each) is 9 tons per hr. or for a 24-hr. operating day, 216 tons. However, for efficient operation, column freezers must be defrosted at regular intervals (about every 3½ hr.)—a 20-30 min. job, plus temperature come-down time. Hence, only three of these units operate while one is being defrosted, reducing their total capacity to 4½ tons per hr.

Experience shows that the continuous freezers need defrosting only after several weeks operation. The processing line up to and including the package filler is sanitized once each shift, while the freezers continue to discharge this frozen product. Downtime for sanitizing accounts for a loss of about 4 tons per day.

Total production capacity of the six units is therefore 7½ tons per hr., or 180 tons minus the loss of 4 tons daily production—a total of 176 tons per day, as stated earlier.

### Packaging Before Freezing

One of the advantages of the continuous-freezer is that it freezes the packaged product, eliminating such product loss as is occasioned by dessication and delay in a carton filling and closing operation after the product is frozen.

Total elapsed time for peas to move from viners into quick-freeze units is 20 min. Fancy grade peas are flumed from the quality graders to a dewatering reel and thence chuted to the bucket-elevator hopper. A volumetric feeder, at the bottom of this hopper, measures and drops the proper amount of peas into the buckets. While in transit in this bucket-elevator, the peas are further dewatered and are only slightly damp when dumped into the vibrator-feeder at the carton filler. Any residual water is removed here as the peas are vibrated in uniform flow to the filler hopper.

The filler employed performs a multiple job—it forms cartons from knockdown flats, fills them with peas, closes the carton lid, and moves the finished package onto two conveyors leading to the two continuous-freezers. Rated at 300 10-oz. cartons a minute, the unit has operated at 350—a rate well above the input demand of the continuous-freezers' total capacity of 188 cartons a minute.

From the forming end of the unit, cartons move by conveyor under the filler. This is a 12-pocket, volumetric type unit. Peas flow from the hopper into the pockets of the revolving turret and thence into cartons automatically positioned below. Filled cartons then are conveyed to the closing section of the unit, then are ejected from the machine into a short chute. A vacuum-operated turret divides this flow to alternately feed each successive carton into one of the two conveyors leading to the continuous-freezers.

### Continuous Package Freezer

Prototype of this FMC continuous-freezer was developed in 1948 (*Food Industries*, March, p. 72, 1948). A test unit first was installed at Pict-Sweet Foods, Santa Clara, Calif., where it still is operating. In the interim, extensive mechanical improvements and refinements have been made in the unit. The two 1952 models at Lamb-Weston operated continually this season with only normal shut-downs for cleaning the line serving them. The operating principle of these freezers is quite similar to their prototype.

Each unit consists of two parallel banks of 47 levels of inward facing shelves spaced about 2 ft. apart. Vertical space between each two shelves is only a few thousandths of an inch greater than the thickness of the cartons. Fabricated of extruded aluminum, each shelf is shaped in the form of a "T" in horizontal position.

In the long part of the "T" are two separate hollows through which the refrigerant circulates. When in operation, each of the 47 shelves has 175 cartons being moved through (8,225 cartons in residence). Vertical bars, each having 47 fingers, that protrude into each shelf, are arranged in a linkage and spaced at intervals of one package apart.

This continuous package progressing mechanism revolves, like a linked chain, around sprockets located at each end of the freezer (top and bottom). Guide rails, top and bottom, also confine the progressor mechanism into parallel rows with semi-circular ends.

Entering cartons are picked up by the progressor fingers, moved down one side of the freezer, then emerge

from the shelves and make a 180 deg. turn between guide rails and enter the shelves on the other side. By the time they have reached the exit end of the freezer, they are completely frozen. The machine is designed to discharge 47 10-oz. frozen cartons of peas every 30 sec. or 108 12-oz. cartons every 60 sec.—38 percent more frozen product in the same size carton with this heavier fill.

Operation of each freezer is robotized by highly efficient control timers. With split-second accuracy, the entry of cartons into the freezer is timed by a solenoid gate located on the accumulator belt leading from the carton filler machine. Cartons, spaced apart accurately, move into a double flight conveyor that elevates them to the freezer shelves.

When the conveyor is filled with 47 cartons, the timer (1) slows the input feed, (2) selects the exact position where cartons are level with entry into the 47 freezing shelves, and then (3) actuates the feed index bar (having 47 fingers) that moves through the flight conveyor, pushes the cartons onto the shelves, dwells there a moment to make certain the cartons are picked up by the progressor fingers, and then goes back to start position. During this feed-in action only three cartons have accumulated on the feed-in belt. The timer then automatically speeds up the input and this loading is repeated within 30 sec.

During the feed-in, progressor fingers are reduced in speed but do not stop entirely. This would endanger freezing-on of cartons in the shelves. A motor-generator set, which develops d.c. for the 5 hp. freezer drive motor, makes variable speeds possible through varying voltage control.

The timer also controls the action of the freezer discharge. It actuates a discharge bar, which is identical to the feed index bar. The 47 fingers reach into the shelves and push the frozen product into the vertical discharge flight screw. This screw moves the cartons upward. They are removed from the top of the screw by an automatic cam and drop onto the exit conveyor belt leading to the labeling machines.

### Column Freezers

The quick-freezing industry is better acquainted with column freezers than with the continuous type. A number of the column units are in operation in plants which for the most part freeze loose products but also handle some packaged foods. The freezer is adaptable to both forms of product freezing. Labor savings when using mechanical freezers may be as high as 85 percent over the old method of mobile rack-and-tray operation.

In the four York column freezers, a typical freezing circuit contains 46 trays, with four on the way into the column and two on the way out. Each tray holds 90 lb. of product. Only one operator is required to load the circuit when the freezer is started. And once loaded, the operation is automatic.

After each cycle is started, by electrically operated timer, operation of the freezer continues until every tray has advanced one step throughout the circuit. In chronological sequence the trays pass first under the filling station and then under a plow that levels and evenly distributes the product in the tray.

Then the tray moves to a point halfway in and half out of the freezer column. Then into position over the hydraulic lift and is elevated in 6 in. into the column where four dogs engage and hold it while the hydraulic lift returns to its original position.

These sequential operations are repeated until there are 40 trays in the column being frozen in a low-temperature air blast. As the 42nd tray enters the bottom of the column, the first tray of frozen peas is pushed off into the discharge conveyor track. Successive trays push this one onto the tray dump. Here, the tray is automatically emptied, and it starts the return trip to its original position on the charging conveyor, thus completing the circuit.

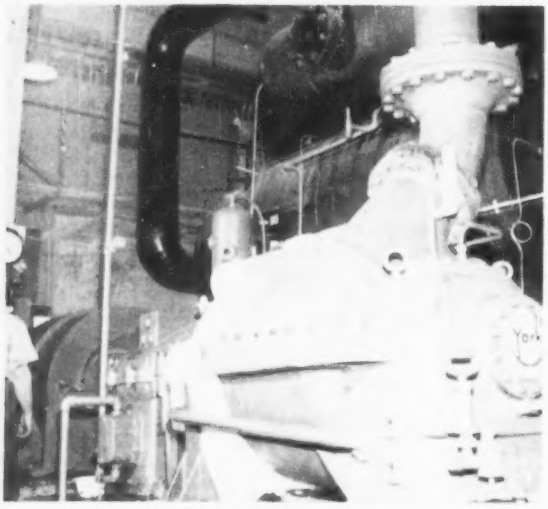
The frozen product moves through a cluster-buster and is conveyed by screw-conveyor to the package filling stations.

### Refrigerating Unit

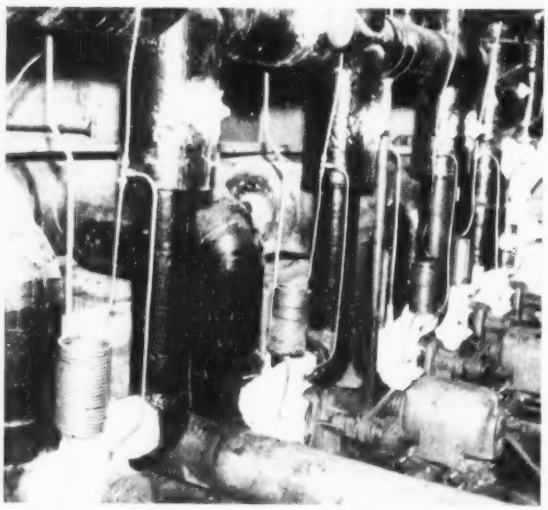
This is the first food-freezing operation to use the York 4CS 4-stage centrifugal turbo-compressor unit. These refrigerating systems are custom built for each particular installation (the complete system includes compressor, condenser, cooler or low pressure receiver, motor, and speed increaser). In actual loaded conditions at this plant, the evaporator temperatures have been between —34 deg. F. and —42 deg. F.

Heart of this system is the turbo-

## Freezing System's Heart and Arteries



**THIS** four-stage centrifugal compressor uses Freon 12, is mechanical center of refrigeration system.



**PUMPS** propel refrigerant to freezers. Coils (above frost covered pumps) warm oil to maintain positive seal.

compressor (using Freon 12 as the refrigerant) connected through a speed-increasing gear to a Westinghouse 3-phase, 60-cycle 800 hp. motor. It takes its suction from a special low-pressure receiver and discharges into a horizontal shell and tube condenser located directly above the low-pressure receiver.

After heat is removed from the refrigerant in the condenser and the discharge gas condensed to a liquid refrigerant, flow is through a high pressure float into an intercooler. Here, the hot liquid refrigerant is cooled to an intermediate temperature by direct evaporation of a portion of the liquid and the return of this gas to an intermediate stage of the turbo-compressor. The sub-cooled liquid refrigerant then passes through a second float-control valve and returns to the low-pressure receiver.

Removal of heat in the evaporators of both types of freezers, column and continuous, is by direct expansion. The Freon 12 is pumped from the low-pressure receiver to the freezer air cooling coils (column freezer) or to the direct freezing shelves (continuous freezer) by eight pumps specially adapted to handle this delicate job. The system operates under 11 in. of vacuum, and pumps are well sealed to prevent refrigerant leak outward or air inward. Leaks would tend to reduce the vacuum of the system or contaminate the Freon with air.

At the inlets to the cooling coils or freezing shelves, the refrigerant is metered under high velocity through orifices and flows through each coil row or individual shelf, where it is evaporated, picking up heat from the product and thence returning as gas-liquid mixture to the low-pressure receiver.

The low-pressure receiver removes entrained liquid from the gas, becomes a reservoir for the cooled liquid refrigerant, and conditions the gas for entry into the suction of the turbo-compressor. It is essentially a double shell arrangement with eliminator sections, de-superheater, automatic purge pick-up, and capacity reduction by-pass.

## Pneumatic Controllers

Refrigeration capacity control of this system is by automatic pneumatic control of a valve in the main suction connection at the compressor inlet. This is operated by a Taylor pneumatic recording temperature controller. Additional capacity control to match load conditions is obtained by variable speed of the compressor through the variable speed 800-hp. motor and by a hot gas by-pass arrangement.

Simplicity of control with a minimum of operating valves is one of the main factors of the turbo-compressor system. Push a button to start the compressor motor, adjust the speed control to desire speed—and it's on the line. And to stop—push the button. The entire turbo-compressor unit is contained in a space 20 ft. wide, 32 ft. long, and 16 ft. high.

## Freezing, Then Packaging

The uniform tempo with which the peas have moved through the process to the freezers now reaches a highly critical point. At no point along the line, from viners to freezers, is it desirable to completely stop the forward flow of product. But, under the emergency conditions, this can be done for a short time period.

However, when the loose-frozen product emerges from the column freezers it must be immediately packaged, cased, and put in low-temperature storage. With the exception of packaging and subsequent storage, the product now represents the total investment in raw material and process costs. This can be irrevocably lost if the packaging line does not function properly.

Specifications for these packaging lines called for a most flexible capacity. The two Marapak units (one is used for the two continuous freezers) and one Kwicklok unit will handle a rated capacity of 14 tons per hr. But, in addition to this, there is a separate line used for packaging extra standard and standard peas in 50-lb. MVP laminated kraft bags inserted in cases. In event of a break-down of one or more of the packaging units, the flow may be diverted and packaging completed with no harm to the frozen product.

Frozen peas flow at the rate of 4½ tons per hr. from the column freezers to a 12-oz. carton filler, a 2½-lb. filler, or to the 50-lb. packaging station. The 12-oz. filler operates exactly like the one preceding the two continuous freezers, only this one fills frozen peas into cartons and closes them. The 2½-lb. line employs a carton former, which supplies cartons to the 12-pocket volumetric turret filler. The filled cartons then move to the carton-closer and on to the labeler. Bulk packages, 50 lb., are filled, weighed by hand, and sealed.

There are five carton wrappers that handle the flow of packaged product. Wrapped packages are cased by hand and cases then sealed by two case gluers. A 350-ft. belt conveyor moves the cased product to the low-temperature storage room. Enroute, a tabulation is made of the contents of each case, with checking by a second operator. This record provides the basis for the perpetual inventory kept of all product in the storage room.

The design of the low-temperature storage room (125 ft. x 200 ft. x 20 ft. high) differs from other rooms of this type inasmuch as this one has no concrete or insulated floor. The walls are insulated with 4 in. of cork, the ceiling with 6 in. of cork plus two layers of double-thick aluminum foil. The floor is the original earth into which has been rolled washed-fine gravel. Three feet below the surface of the floor is a system of 3-in. drain tile, set on 3-ft. centers, and pitched to facilitate gravity air flow.

It is assumed that the potential loss of refrigeration through the floor of this room is no greater than that through an insulated concrete floor. This storage room was put into operation more than two years ago, and the last few core-tests show frost penetration into the earth to a distance of 22 in.

Refrigeration is provided by two of the new York 16-cylinder V/W ammonia compressors directly connected to 1,170-rpm., 100-hp., normal torque, squirrel cage induction motors. A York horizontal shell-and-tube condenser and two York IDV-10A industrial air conditioners complete the system.

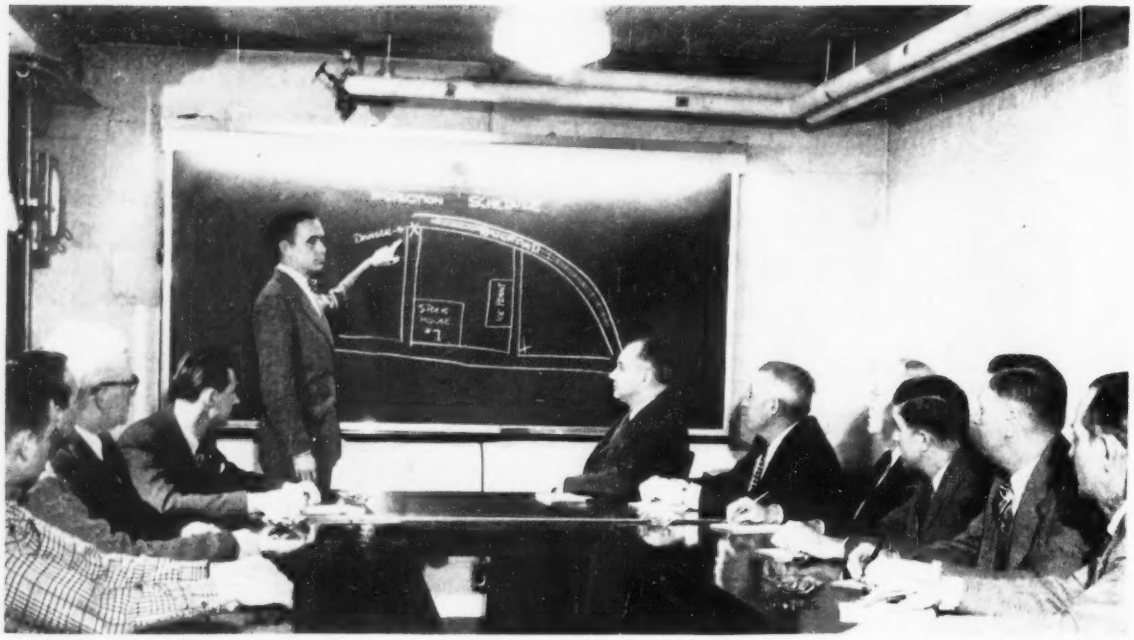
The cooled air is blown through a duct from the two conditioners up and along the center of the room, just below the roof line. Here, it is delivered along the length of the duct, blowing out from center to sides of the room through tapered outlet nozzles designed to give full room throw with high secondary air motion.

## Water Used Effectively

Two deep wells on company property provide 1,250 gpm. water each for processing uses. Nearly all this water flows first through the York turbo-compressor condenser and then to process without waste. Temperature of the well water is 63 deg. F., and that which flows through the condenser and thence to the process rises to 66-73 deg. F.

The boilers, installed earlier for canning purposes, are more than adequate for the freezing operation. There are three 600-hp. boilers, but when the plant is quick-freezing peas only one of these is operated.

*Acknowledgements: In addition to crediting cooperation of executives and engineers of Lamb-Weston, Inc., in the development of information for the above article, the authors also wish to acknowledge the assistance of the following: T. A. Dungan, consulting process engineer, 10285 Magdalena Ave., Los Altos, Calif.; A. R. Davidson, sales engineer, York Corp., Yakima, Wash.; and Food Machinery & Chemical Corp., San Jose, Calif.*



**KEY PERSONNEL** are members of Hamm's combined good housekeeping and safety committee, lending teeth to decisions reached in biweekly meetings.

# Show-Place Is Safe Place

Done primarily to impress visitors, good housekeeping check-up pays dividends in low accident rate and better employee performance. Committee action does it

**J. J. RENNER and O. D. DUGGINS**

Safety Engineer and Asst. Maintenance Superintendent, respectively, Theo. Hamm Brewing Co., St. Paul, Minn.

When Theo. Hamm Brewing Co. modernized its facilities, a good housekeeping committee was set up to assure that conditions were show-place perfect. But as the committee functioned, its viewpoint and scope broadened. Recommendations were made for major changes as well as minor chores. And it gradually dawned that a desire for improved working conditions—rather than viewing conditions—was the actual force behind its thinking.

Today, the full implications of its evolution is apparent in its title of Good Housekeeping and Safety Committee. Composed of key personnel and meeting twice a month, this group has the unique, but logical, function of meshing plant upkeep with a progressive safety program. The result is a reduction of lost man-hours to a new low each succeeding month.

Lofty objectives, however, are not the whole answer to a dual safety-maintenance program. We credit our growing success to a well-defined committee organization and a rigid follow-up system for carrying out its directives.

## Managers Make It

Ability to act is the prime requisite of any committee. Consequently, ours is composed of managers and assistant managers of all departments. Included are the assistant brewmaster, chief operating engineer, maintenance superintendent, assistant maintenance superintendent, grain elevator superintendent, yard superintendent, bottling department superintendent, personnel director, safety director, office manager, and plant engineer.

Officers of the committee are a trained safety director, who acts as secretary, and the assistant maintenance superintendent, who executes recommendations.

The committee meets formally the afternoon of every second Tuesday, and its sessions takes place in round-table fashion for about two hours. At the conclusion of this conference, two locations in the plant are arbitrarily selected, and two groups go off on an intense inspection tour. Then this tour is written up and discussed during the following meeting.

During a typical meeting, the first item on the agenda is a report by the committee's executive officer on work done on recommendations resulting from previous inspection tours. Since some of the improvements often involve considerable time and money, these usually are held over for committee discussion. Also, a follow-up report on previously recommended and approved work of this type is read.

Next subjects for discussion are number and type of lost-time accidents during the previous two weeks. This report is compiled by the safety director, and accident causes and prevention are subject to group analysis. If the slightest suspicion of an in-plant mechanical cause comes to light, the highest priority is given to have the offending situation immediately corrected.

Under new business, one of the

most important subjects is a review of employee suggestions. Each of these is aired and discussed by the committee, a unanimous decision being required for its adoption. If the suggestion is rejected, however, its donor is notified and a complete reason given.

Another important item near the close of the formal meeting is the designation of a "housekeeping rating" for the departments previously inspected. This can be an "A" for excellent, "B" for good, and "C" for fair. "D" means that improvement is desired. Ratings are in certificate form and are hung in a prominent place in the department involved.

## Inspection Tours

Each department or unit location in the plant—such as the garage, brew house, malt plant, bottle house, and stock house—is liable to inspection at least once every six months by committee members. It is important to note that none of the departments knows when the inspection will take place. So excellent conditions tend to be maintained at all times.

At the end of its formal meeting, the committee decides on two locations and splits into groups to make simultaneous tours of these facilities. The foreman of the department or location involved goes along with the inspecting party.

Obvious housekeeping shortcomings are quickly noted during the inspection. Debris, rags, dust, misplaced tools, non-supporting bolts, and hangers are entries for this list. Also, moisture and paint condition are tabbed. In fact, any eyesore—no matter how insignificant—is liable to be spotted.

More objective measurements are also made to gage area conditions. Whenever there is reason to believe that gas is present, detectors are toted along to test dubious atmospheres.

Mechanical safety aspects of each location are closely scrutinized. Possible booby traps, exposed nails and tacks, weak guard rails, safety lights, and lock-out devices are noted for existence and working condition. Also, the state and completeness of employee protective clothing is part of the inspection.

Other important items watched for are floor conditions, inoperative or non-functional equipment or material, glass window conditions, leaky and inoperative plumbing, and washroom tidiness.

## A Typical Report

After the tour, all rough notes taken by the group are collected by the secretary and worked into a typewritten report which is distributed to all committee members. Also, the foremen involved get a copy for their immediate attention so that obvious shortcomings can be quickly handled. It should be noted that the president also receives a copy of each inspection report. And he often appears before the committee to comment on some phase of its activities, as well as to encourage and support it.

Here are recommendations from a typical inspection tour, by four committee members, through the grain elevator.

*Scale Floor*

1. An extension cord used should be replaced by a permanent installation.

*Monitor Floor*

1. A permanent light fixture should be installed on the grain separator as there is danger of the present extension cord falling and the light breaking. This could result in an explosion because of dust in the area.

*Bin Floor*

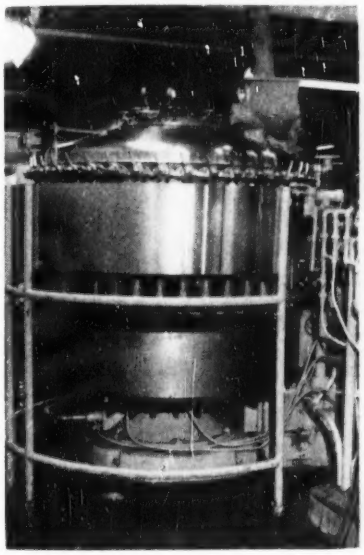
1. A guard should be placed on the gears of the motor located at the end of No. 24 conveyor. It is possible for men oiling this machine to accidentally catch their arms in the gear.
2. A bracket—located just north of the separator machine—is loose in the ceiling and should be repaired.
3. Something should be done to the conveyor on the separator to keep it from throwing dust out onto the floor area.

*Basement*

1. There is a crack in the concrete ceiling which should be repaired. Some oil is now dripping through this and falling at the base of the elevator.
2. One ladder is unsafe for use. It is recommended that this ladder be replaced or repaired.

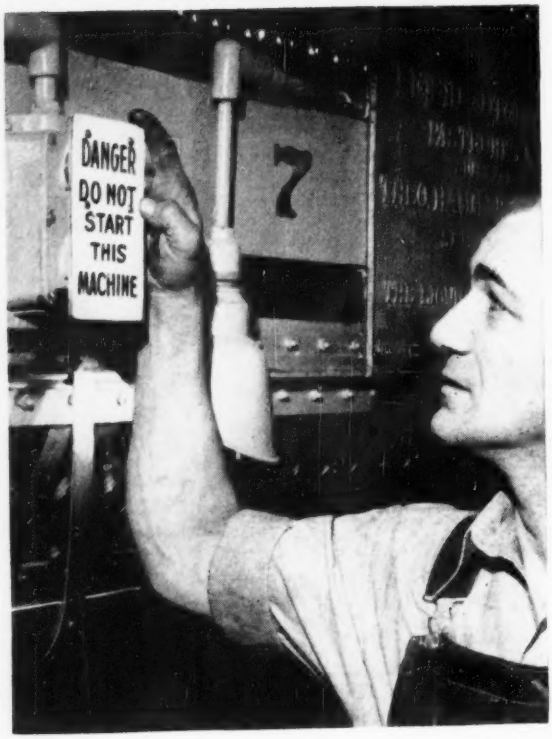
*Note:* The grain elevator, as a whole, was in splendid condition. Notwithstanding the dust and chaff normal to

**ABSENCE** of hoses and non-functioning equipment in fermenting cellar avoids distraction of visitor on this guided tour. This type of good housekeeping also saves worker injuries due to falls over obstructions. It is a good example of safety achieved through show-place neatness in a food plant.



**GUARD RAILS** around moving equipment protect transients as well as workers in area. Note raised receptacle (bottom, right) for piping.

**SAFETY GLASSES** are mandatory for the visitor as well as the employee in locations such as the bottle house, where flying glass is a hazard.




**SAFETY SIGNS** are used to blank-over start-stop buttons when maintenance work is in progress, eliminating a serious hazard.

the location, it was very clean and orderly. An "A" (excellent) rating is recommended.

## How Dealt With

When notes from various inspecting committee members are assembled into a report, the executive officer tabs off those items that can be handled at no cost by the department itself. And it is the responsibility of the foreman involved to have the things done by the time of the next committee meeting. A personal follow up and tour of the premises by the executive officer before meeting time advises of progress.

However, some of the work—such as the electrical wiring and guardrail fabrication listed above—requires maintenance staff action. Shop orders are written up to handle such work. Available to do the jobs are millwrights, painters, machinists and foreman, plumbers, pipefitters and foreman, cabinet makers, carpenters, blacksmiths, electricians, gardeners and their supervisors.

Outside contract orders for work to carry out inspection recommendations are also placed by the executive officer. Large expenditures are carefully discussed and are usually approved by the president. However, the policy is to not limit funds for the purpose.

Innovations that lead to easier maintenance, more attractive premises, and safer operations are also considered by the committee. Thus, new cleaning machines, detergents, paints, safety floors, uniform trash bins, and so forth, are among many purchases decided on at committee meetings. Usually, one member of the group comes up with the idea and furnishes data and literature on the subject. And often a demonstration of the new product is made before the assembled committee by its manufacturer.

## Suggestions That Work

Many invaluable improvements, however, stem directly from the employees via a suggestion system. A special form is filled out by the worker describing a needed safety or housekeeping measure and turned over to his department head. If a small expenditure is involved, this suggestion can be approved or vetoed immediately and the work carried out if desired.

If an employee's suggestion involves a fair-size expenditure, or if it is turned down by his department head, it then goes to the committee for its O.K. or rejection.

Here are some typical suggestions and committee reaction to them:

**Suggestions:** A stationary ladder is needed between the third floor of the malt plant and the canopy which extends across to the grain elevator. A short, dangerous ladder now is used by men working in this area.

**Action Taken:** A work order was immediately drawn up for construction of a permanent ladder of the desired dimensions.

**Suggestion:** Do the scales on the fourth floor of the brew house have to be set on wooden skids? These are an eyesore.

**Action Taken:** Prompt correction by the maintenance department.

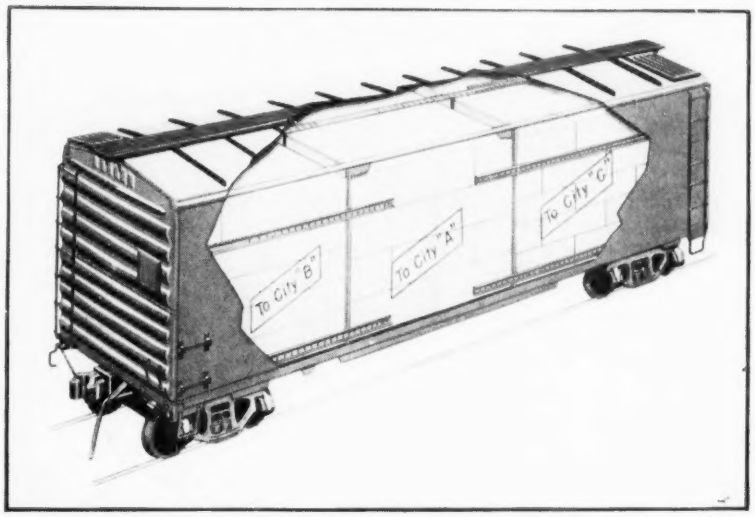
**Suggestion:** A hydraulic jack is needed to open doors on grain cars.

**Action Taken:** Mr. Duggins informed the committee that the railroads are starting to install paper doors in place of wood grain doors, and such a jack now is unnecessary.

**Suggestion:** Floors in the bottling house are excessively slippery when wet. Some kind of non-slip covering is needed.

**Action taken:** A new non-slip safety walk to be placed over small portion of the tile flooring for a trial period.

Needless to say, quick action by the committee on an employee's thoughtful suggestion has done much to boost worker interest in his job and environment. And in the final analysis, it's the cooperation of the average employee that will determine how far a safety and maintenance program will go.




**CUTAWAY VIEW** of box car shows how gates borne on trolley rail provide three adjustable compartments. Two locking rails on each side and two on bottom and roof are flush-mounted. They supply eight locking points.

**SYRUP DRUMS** form base for starch load at one end of car. Gate-carrying rail, also central locking rail, will be noted at ceiling level in car.

# Compartmentized Car

## Accelerates Loadings, Cancels Travel Damage For Midwest Miller

**FE STAFF**

Like the common cold, shipping damage has long been a nagging, yet accepted malady of both industry and carriers.

**But here is a new specific remedy that bids fair to save many a shipment "fatality" enroute.**

Designed for standard PS-1 freight cars, the new system—developed by Pullman-Standard Car Mfg. Co.—is known as "compartmentizing." As the name implies, this means that part or mixed loadings can be segregated. Employed are built-in sliding metal gates.

One of the first to test compartmentizing was the A. E. Staley Co., Decatur, Ill., which recently shipped a mixed load of bags, cases, and drums to two west coast locations via one of the specially equipped cars.

### Dunnage Eliminated

The company reported the actual loading to be considerably easier and less expensive than conventional handling. And both its western customers sent enthusiastic notice that their goods had come through in excellent condition.

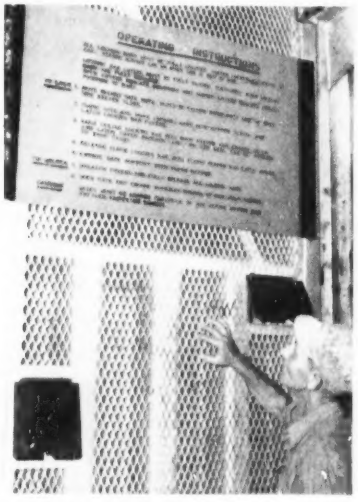
In conventional practice, Staley would have separated and braced its two consignments with wooden dunnage, at a cost of approximately $20. Besides saving the time needed to build these divisional gates—and their unsalvageable cost—considerable nail damage to the car walls and possibly to nearby cargo was thus avoided.

"Compartmentizer" cars are regulation length—40 ft. with 6 ft. doorway. Inside, the two sets of metal grill gates operate on tracks and can be pushed back to the end of the car or extended to give shipping spaces 17 ft. long. Once locked in place they hold the load firmly.

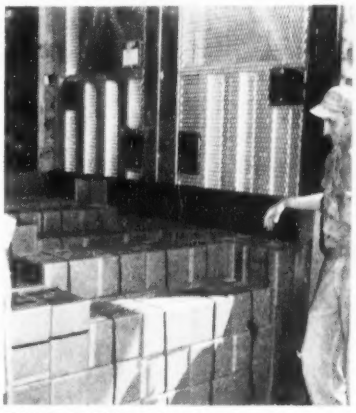
Since the gates can be locked into place at 3 in. intervals, Staley found it possible to load right up to the face of the grill. The test load sent by the company was ideal for the purpose since it was a mixed load of stop-off shipments.

The first railroad to equip its cars with the new equipment has been Western Pacific, with 20 units in service for over a year. In all that time they report a clean record in damage prevention when handling fragile loads, such as glass packed foods and packaged cereals.

Parts needed to set up a car with the system can be purchased in "package" form. Or actual installation can be made in the shops of its manufacturer.



**GATE IN PLACE.** Instructions tell how to handle locking bars through openings. Latch covers can be padlocked.



**WITH BOTH** ends of car loaded and gates locked, shipment is now built up in center to complete lading.

# Picking the Proper Screens For Most Efficient Sifting

Here are practical facts on silks vs. metals . . . aperture, wire diameter, and mesh . . . capacity and life expectancy . . . and factors of product analysis

**A. T. TEMPLIN**

Application Engineer, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

One of the major requirements in a good food-processing sifting installation is choice of the proper screen for the specific product.

Selection should be carefully made by the processor on the basis of performance required, anticipated life, and original cost.

Hence, it is of prime importance to have an understanding of the broad field encompassing "proper screens" and how to "narrow down" to the optimum unit for the application in question.

### Briefing the "Why" of It

**A product consisting of small granular particles, either in their natural state or reduced by a mill, usually must be graded, or separated according to size, before it can be used to greatest economic advantage. Also, in the production of food products, such ingredients must be screened free of foreign materials before they are entered into process.**

### What They're Made Of

Basically, screens are divided into two groups—silk and metal. Silk screens are generally less durable, but their lower cost makes them economical for many applications. Silk will handle efficiently an abrasive product in the very fine mesh size.

Metal screens are available in both plain and stainless steel, brass, phosphor bronze alloy, and other special alloys. To avoid metal pickup, foods and also highly corrosive materials require the use of a stainless steel screen. The problem of whether to use silk or metal is solved strictly on the basis of the physical and chemical properties of the material to be sifted.

Within each group there is a multitude of screen meshes from which to select the proper ones. The first step is to answer this question: "What, precisely, is the screen analysis of the product to be graded?"

A screen analysis is merely the examination of the distribution of the particles in the product in relation to size, from largest to the smallest. It shows how many pounds of the total material to be graded fall within each size range.

### Two Standards Used

The analysis is made on the basis of either the U. S. Standard or Tyler Standard screen meshes. These two merely assign a definite aperture to every listed mesh number. For example, a 48 Tyler Standard mesh has an aperture of 0.0116 in., which is the same size aperture assigned to the 50 U. S. Standard.

Mesh is defined as the number of apertures per lineal inch. Note that this definition does not say anything about the size of the aperture or the wire diameter. Mesh, aperture, and wire diameter are directly related to each other and a change in one requires a compensating change in one or both of the other two. For example, mesh can be held constant while changing the aperture and wire diameter. Or, if it is desired to keep the aperture constant but increase the wire diameter, the mesh will also change.

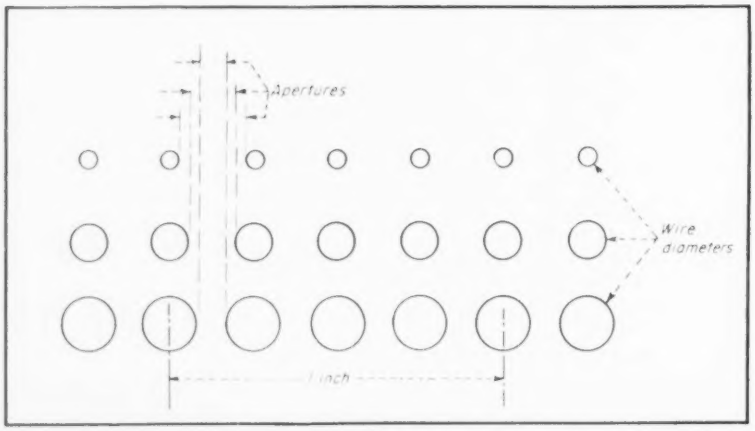
The effect of holding the mesh constant and changing the wire diameter is illustrated in the accompanying drawing. Note that in all three cases there is the same number of wires per lineal inch, but as the wire diameter increases the space between the wires decreases. Thus, there are various combinations resulting from changing the mesh, aperture, or wire diameter.

### Aperture Is First

Mesh, by itself, obviously is not the answer to selecting the correct screen. The product analysis tells how much of the material to be sifted must go over the screen and how much through it. From this information, the correct aperture is chosen and, depending upon the type of material used to make the screen, the mesh is determined. The combination of wire diameter with the aperture will give mesh.

Wire diameter, of course is selected on the basis of the physical and chemi-

(Turn to page 134)




**DIFFERENT** diameter wire changes the aperture size—even though the mesh is held constant to same number of wires per lineal inch.

# Screen Specifications and Mesh Comparisons

(Note: All area figures are given as percentage of open area per unit screen area)

| U. S. Std. Mesh | Tyler Std. Mesh | Aperture | Mill Screen Mesh | Mill Screen Aper. | Mill Screen Area | Tuf-Tex* Mesh | Tuf-Tex* Aper. | Tuf-Tex* Area | Dur-Lov* Mesh | Dur-Lov* Aper. | Dur-Lov* Area | XX Silk No. | XX Silk Mesh | XX Silk Aper. | Grit Gauze No. | Grit Gauze Mesh | Grit Gauze Aper. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 | .445 | 79.6 | | | | | | | | | | | | |
| | 2½ | .312 | 3 | .292 | 76.7 | | | | | | | | | | | | |
| | 3 | .263 | | | | | | | | | | | | | | | |
| 4 | 4 | .185 | 4 | .215 | 74.0 | | | | | | | | | | | | |
| 5 | 5 | .156 | 5 | .168 | 70.6 | | | | | | | | | | | | |
| 6 | 6 | .131 | 6 | .139 | 69.6 | | | | | | | | | | | | |
| 7 | 7 | .110 | 7 | .115 | 64.8 | | | | | | | | | | | | |
| | | | 8 | .100 | 64.0 | | | | | | | | | | | | |
| 8 | 8 | .093 | 9 | .088 | 62.7 | | | | | | | | | | | | |
| 10 | 9 | .078 | 10 | .080 | 64.0 | | | | | | | | | | | | |
| 12 | 10 | .065 | 12 | .065 | 60.8 | 14 | .0620 | 76.4 | 14 | .0620 | 76.4 | | | | 14 | 13.5 | .0689 |
| 14 | 12 | .055 | 14 | .054 | 57.2 | 16 | .0535 | 73.3 | 16 | .0535 | 73.3 | 0000 | 18 | .0520 | 16 | 15.5 | .0582 |
| | | | | | | | | | | | | | | | 18 | 17.5 | .0519 |
| 16 | 14 | .046 | 16 | .0465 | 55.4 | 18 | .0466 | 70.2 | 18 | .0466 | 70.2 | | | | 20 | 19 | .0456 |
| | | | | | | 20 | .0410 | 67.2 | 20 | .0410 | 67.2 | | | | 22 | 21 | .0420 |
| 18 | 16 | .039 | 18 | .0406 | 53.4 | 22 | .0380 | 69.7 | 22 | .0380 | 69.7 | 000 | 23 | .0385 | 24 | 23 | .0376 |
| | | | 20 | .0360 | 51.8 | | | | | | | | | | | | |
| 20 | 20 | .0328 | 22 | .0320 | 49.6 | 24 | .0342 | 67.2 | 24 | .0342 | 67.2 | | | | 26 | 25 | .0322 |
| | | | 24 | .0287 | 47.4 | 26 | .0310 | 64.8 | 26 | .0310 | 64.8 | | | | 28 | 27 | .0304 |
| 25 | 24 | .0276 | 26 | .0275 | 51.1 | 28 | .0282 | 62.4 | 28 | .0282 | 62.4 | 00 | 29 | .0286 | 30 | 29 | .0286 |
| | | | 28 | .0257 | 51.8 | 30 | .0268 | 64.8 | 30 | .0268 | 64.8 | | | | 32 | 31 | .0260 |
| | | | | | | 32 | .0248 | 62.7 | 32 | .0248 | 62.7 | | | | 34 | 33 | .0242 |
| 30 | 28 | .0232 | 30 | .0238 | 51.0 | 34 | .0229 | 60.7 | 34 | .0229 | 60.7 | | | | 36 | 35 | .0224 |
| | | | 32 | .0223 | 50.9 | 36 | .0213 | 58.7 | 36 | .0213 | 58.7 | 0 | 38 | .0206 | 38 | 37 | .0215 |
| | | | 34 | .0204 | 48.1 | | | | | | | | | | | | |
| 35 | 32 | .0195 | 36 | .0188 | 45.8 | 38 | .0198 | 56.7 | 38 | .0198 | 56.7 | | | | 40 | 39 | .0197 |
| | | | 38 | .0178 | 45.8 | 40 | .0185 | 54.8 | 40 | .0185 | 54.8 | | | | 42 | 40.5 | .0188 |
| | | | | | | 42 | .0183 | 59.1 | 43 | .0183 | 61.6 | | | | 44 | 42.5 | .0184 |
| | | | | | | 44 | .0172 | 57.4 | 46 | .0172 | 62.9 | | | | 46 | 44.5 | .0170 |
| 40 | 35 | .0164 | 40 | .0165 | 43.6 | 46 | .0162 | 55.8 | 48 | .0163 | 61.5 | | | | | | |
| | | | | | | 48 | .0153 | 54.2 | 50 | .0155 | 60.1 | 1 | 48 | .0157 | 48 | 46.5 | .0157 |
| | | | | | | 50 | .0145 | 52.6 | 54 | .0145 | 61.5 | | | | 50 | 48.5 | .0148 |
| | | | | | | | | | | | | | | | 52 | 50.5 | .0144 |
| 45 | 42 | .0138 | 45 | .0142 | 40.8 | 52 | .0137 | 51.0 | 56 | .0138 | 60.2 | 2 | 54 | .0138 | 54 | 52.5 | .0138 |
| | | | | | | 54 | .0130 | 49.4 | 58 | .0132 | 59.0 | | | | 56 | 54.5 | .0131 |
| | | | 50 | .0125 | 39.1 | 58 | .0127 | 54.6 | 60 | .0127 | 57.8 | 3 | 58 | .0125 | 58 | 56.5 | .0128 |
| | | | | | | 60 | .0122 | 53.3 | 62 | .0121 | 56.5 | | | | | | |
| | | | | | | | | | | | | | | | 60 | 58 | .0118 |
| 50 | 48 | .0116 | 55 | .0112 | 37.9 | 64 | .0111 | 50.7 | 66 | .0112 | 54.2 | 4 | 62 | .0111 | 64 | 62 | .0111 |
| | | | | | | 66 | .0106 | 49.4 | 70 | .0106 | 54.9 | 5 | 66 | .0105 | | | |
| | | | 60 | .0102 | 37.5 | 70 | .0103 | 51.8 | 72 | .0102 | 53.8 | | | | 66 | 64 | .0103 |
| 60 | 60 | .0097 | | | | 72 | .0099 | 50.7 | 74 | .0098 | 52.7 | | | | 68 | 66 | .0097 |
| | | | | | | 74 | .0095 | 49.6 | 76 | .0095 | 51.7 | | | | 70 | 68 | .0094 |
| | | | | | | 76 | .0092 | 48.4 | 78 | .0091 | 50.6 | 6 | 74 | .0092 | | | |
| | | | | | | 78 | .0088 | 47.3 | 80 | .0088 | 49.6 | | | | 72 | 72 | .0088 |
| 70 | 65 | .0082 | | | | 80 | .0085 | 46.2 | 84 | .0084 | 49.8 | 7 | 82 | .0082 | | | |
| | | | | | | 84 | .0079 | 44.1 | 88 | .0079 | 47.9 | | | | | | |
| | | | | | | 88 | .0074 | 42.0 | | | | 8 | 80 | .0076 | | | |
| 80 | 80 | .0069 | | | | 90 | .0071 | 41.0 | 94 | .0071 | 45.0 | | | | | | |
| | | | | | | 94 | .0066 | 38.9 | 105 | .0065 | 46.9 | | | | | | |
| 100 | 100 | .0058 | | | | | | | 120 | .0057 | 47.3 | 9 | 97 | .0059 | | | |
| | | | | | | | | | | | | 10 | 109 | .0054 | | | |
| 120 | 115 | .0049 | | | | | | | 145 | .0047 | 46.4 | 11 | 116 | .0049 | | | |
| 140 | 150 | .0041 | | | | | | | | | | 12 | 125 | .0042 | | | |
| | | | | | | | | | | | | 13 | 129 | .0039 | | | |
| | | | | | | | | | | | | 14 | 139 | .0037 | | | |
| 170 | 170 | .0035 | | | | | | | | | | 15 | 150 | .0036 | | | |
| 200 | 200 | .0029 | | | | | | | | | | | | | | | |
| 230 | 250 | .0024 | | | | | | | | | | | | | | | |
| 270 | 270 | .0021 | | | | | | | | | | | | | | | |
| 325 | 325 | .0017 | | | | | | | | | | | | | | | |
| 400 | 400 | .0015 | | | | | | | | | | | | | | | |

* Light wire screens woven from special composition, non-corrosive, highly durable wire.

### Salient Questions to "Hound Out" the Answers

You will gain most value for your company, when engaging in accounting service, if you go right to the heart of operations with straightforward questions trimmed to track down straightforward answers.

Here are vital queries to pose, as recommended by the American Institute of Accountants—

1. **"Where can we cut costs?"**
   The problem often is to know where to look. Once you know, you can start pinpointing specific items.
2. **"Are we accepting—or giving—too much credit?"**
   To do either is bad. Adequate records can reveal when you are on safe ground.
3. **"Are we taking advantage—through advance planning—of legitimate tax saving opportunities?"**
   Good records will do more than indicate this—they'll also back up legitimate tax deductions.
4. **"How does our inventory shape up?"**
   When to liquidate, and when to put extra dollars into a more varied inventory, are tough decisions. Here, expert accounting opinion will be of great help.
5. **"Have we included everything we should in our overhead?"**
   Hidden overhead costs can be more expensive than you realize. Do you slip up on such items as the time it takes to order stock? Are all costs of waste and spoilage reckoned?
6. **"Generally, do you think our business is in good health?"**
   If it is fundamentally sound, it shouldn't take long to smooth out current matters. If not, it will be wise to learn why immediately—and institute remedial measures.

# *Accounting* Your Way To Bigger Profits

**It's Done by Expert Plugging of Drains on Dollars**

*Based on information supplied by the American Institute of Accountants, national professional society of Certified Public Accountants, this article was prepared by Special Writer Claire Trieb Slote.*

CAUGHT in a tight vise—between rising labor and material costs on the one hand, and a narrowing profit margin on the other—today's food processor must have at his command every modern management technique that will prevent profit leaks.

One of the most important of these methods is modern accounting. Small and large businessmen have learned that good accounting can help solve the pressing problems by showing—

- **—How to set up realistic and profitable prices.**
- **—How to comply with complex government regulations.**
- **—How to plan ahead for financial soundness.**
- **—How to save on taxes, and**
- **—How to maintain records that reveal the truth about the business.**

Dealing as he does with dozens of different industries, the public accountant brings to each the benefit of his experience with all.

How can he help you? Here are a few case histories in the food processing industry that demonstrate how:

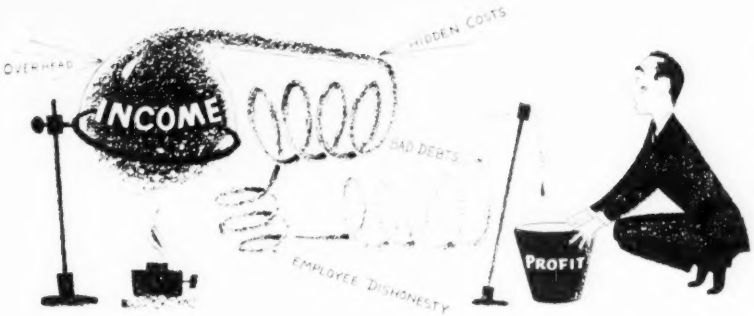
**When are prices profitable?** A small Midwest meat canner became alarmed recently at his low profit picture. His volume for the season had been satisfactory, his costs were not out of line, and he had always figured his prices carefully.

But his profit was several thousand dollars lower than he estimated it should be. So he engaged a CPA.

After a painstaking check, the accountant reported: "Too many quantity sales at more than the usual discount."

The lion's share of this company's sales was divided among four lines. Anxious to boost volume, the canner had been pushing two of them, jumping at every chance he got to promote quantity orders. He had figured that the extra discount he allowed wouldn't make too much difference in the overall profit margin—just so long as he could boost his volume.

"That theory works only if the cut-rate sales are on additional business, not when they apply to your normal




volume," the accountant pointed out. Actually, the canner had been upping his total business in the two lines by only 3 percent over normal. In other words, his discounts had been cutting seriously into the calculated profit margin.

Once these sales were unmasked as virtual "loss leaders," the canner decided to set up an accounting system which would show his sales periodically—by individual lines. Armed with this information, he'd be able at any time to determine in which lines, and to what extent, special discounts were advisable.

**Don't get tangled in red tape.** Veterans of the last war will remember the epigram: "There's the right way to do something, the wrong way, and the Army (or Navy) way." It might well apply to today's maze of regulations in which businessmen have neither time nor inclination to keep abreast of all the ramifications of government regulations they must observe.

One food processor, caught in the middle of pre-Christmas rush, called his employees together with this proposition: "Let's get all these orders out of the way by putting in about 56 hours this week. You can take an extra two days off next month—whenever you want to."

His workers agreed. But when the accountant examined the payroll accounts, he asked this question: "How come no overtime for that 56-hour week?"

The explanation didn't satisfy him. Since the company was engaged in interstate business, it was subject to federal wage and hour regulations. "You'd be violating the regulations and leaving yourself open to a pretty severe penalty," he said. "Even when an employee agrees to take equivalent time off later, overtime usually has to be paid for any one week where the employee works over 40 hours. The government can make violators pay double the amount owed to the employees."

A check with the processor's lawyer confirmed that it's safer not to chance such wage and hour violations—even though intentions may be good.

**Look ahead for trouble.** A New England bottler came upon a terrific bargain in processing equipment. It would mean a heavy cash outlay, but he felt it would be worth it in resultant operating economies. He mentioned the deal to his accountant, who suggested that maybe they'd better lay out a seasonal forecast first. Fear was that the bottler might be overextending himself financially.

Actually, two forecasts were made—one showing the overall sales, pur-

chase, and expense picture, the other showing the company's likely cash position month by month.

The apprehensions were very well founded. If the bottler made his cash purchase at that particular moment, he wouldn't realize enough operating savings to refill his cash account for months, maybe years to come. Meanwhile, the forecasts indicated, the outlay would "strap" him for regular cash purchases and expenses to be met during the season.

**Cutting down tax troubles.** A New York packer who retained a CPA for an audit was amazed on the first consultation to learn that Albany and Washington owed him refunds totaling $500.

The accountant had noted that the packer's wife had worked in the office for three years at $60 a week, and the packer had paid federal social security and federal and state unemployment insurance taxes on her salary.

"You aren't supposed to pay those taxes on a wife, nor should she have been making employee contributions," the accountant pointed out. Since they came to 5 percent of her salary for 1949 and 6 percent for '50 and '51, the couple had contributed $500 unnecessarily to Washington and Albany over the three-year period. The accountant promised to stop by with refund applications the next day.

In order to avoid overpaying taxes—something the government wants no company to do—the businessman must get into the habit of thinking taxes all year 'round. Tax consciousness should enter into every decision he makes—from buying a new truck to undertaking a major plant expansion.

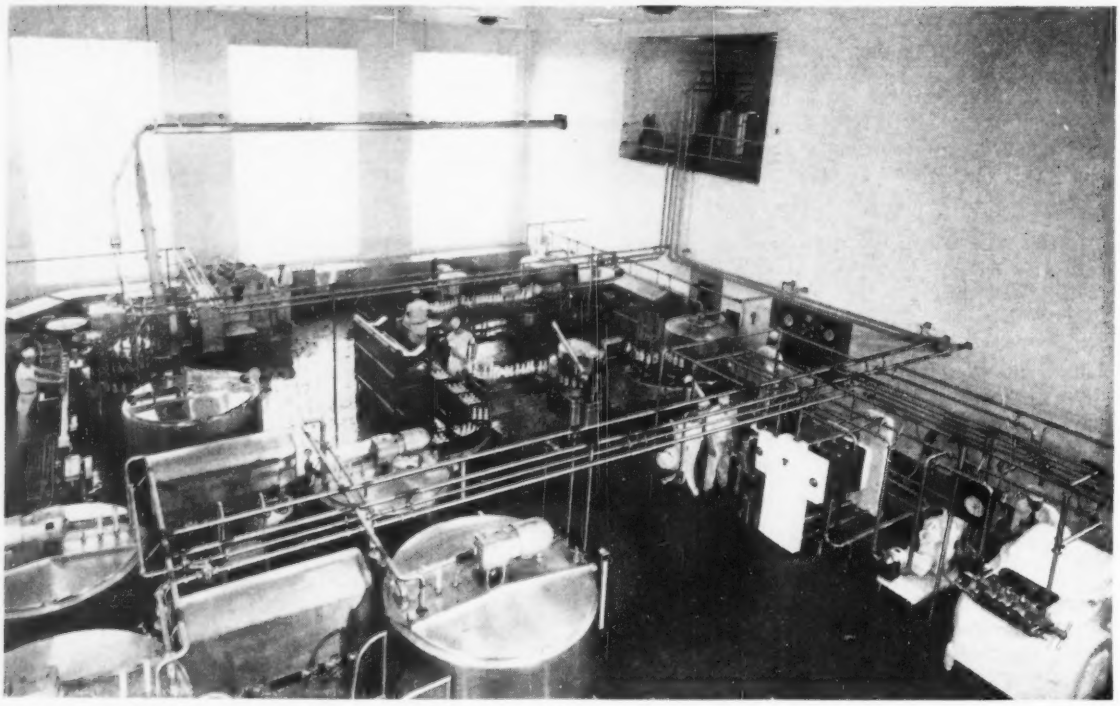
**Disaster warnings.** Records set up to reveal costs and meet tax requirements serve also to help management spot in advance weaknesses that may eventually spell bankruptcy. The fact that many companies don't appreciate the value of proper record-keeping is revealed in a recent study of 408 business failures. It showed that 53 percent of the bankrupt firms did not keep adequate records!

Few businesses go broke overnight. There are usually warning signals. For example, one processor failed because he was overloaded with too many outstanding accounts. Lacking efficient collection methods, and fearing to press for payments lest he lose a customer, he scuttled his business. Actually, the customer whose account is long overdue is often a lost customer anyway. Objective records could have indicated the point of diminishing returns before it arrived.

Another processor came close to failure because he starved his business by taking too much salary.

The list of pitfalls is endless. With-

(Turn to page 190)



**PROCESSING** area in Damascus Milk Co's. Portland, Ore. plant where recirculation cleaning methods were investigated is typical of a practical operating milk plant not designed for this type cleaning.

## *Study Substantiates Benefits of*

# Cleaning Pipelines in Place

Cleanup time is cut more than 70 percent, worker fatigue reduced, coliform bacteria eliminated in West Coast dairy. Additional savings result from use of thinner, less expensive piping, hotter, stronger detergent solution

**R. B. PARKER, P. R. ELLIKER, G. T. NELSON, G. A. RICHARDSON and G. H. WILSTER**

Oregon Agricultural Experiment Station, Corvallis, Ore.

A number of advantages have accrued to dairy plant operators as the result of in-plant or recirculation detergent-solution cleaning of sanitary piping.

Most significant is the saving in time and labor—reported in excess of 50 percent, with further economies in proportion to length of the piping.[1]

Furthermore, bacteriological condition of the recirculation-cleaned lines has been found to be uniformly satisfactory.[2,3,4,5,6]

Since the lines are not handled as frequently as in the conventional take-down procedure, there is little chance for damage to piping and fitting.[3,4] This permits the use of thinner, less expensive piping and fittings.[7,8] Also, the lines can be mounted higher, which permits additional headroom.

In some instances milk lines have been permanently welded in place, permitting a smooth, uninterrupted interior surface.[5,9] Also, equipment manufacturers have provided fittings designed especially for recirculation cleaning.[8,10] Higher solution temperatures can be used, and selection of detergents is not limited to those which are non-irritating to the skin.

In addition, the authors have observed that cleanup personnel become less fatigued in operating a well-controlled recirculation system and, as a result, they maintain a greater degree of efficiency.

Results reported here were obtained in a 12-month investigation in cooperation with the Damascus Milk Co., Portland, Ore. Studies of the following items were undertaken: Recirculation equipment; effectiveness of different cleaners; temperature and velocity of cleaner and rinse solutions; comparative suitability of glass and metal piping; gaskets; valve sanitation; and labor requirements.

This project actually involved investigation of two different systems: (a) The raw, and (b) the pasteurized milk lines, which were cleaned in separate operations. The shorter of the two systems was the pasteurized milk side, with about 300 ft. of 2- and 2½-in. stainless steel sanitary piping. The raw milk side was considerably longer, with over 750 ft. of 2- and 2½-in. piping. Lines were dismantled only for inspection purposes or to replace gaskets.

After preliminary experimentation, the following general procedure was used throughout:

1. Pre-rinse by circulating fresh water at 100 deg. F. for 5 min.
2. Wash with alkaline detergent at temperatures ranging 130-170 deg. F. for 20-30 min. Time the wash period after the desired temperature is reached.
3. Remove valve plugs, brush plugs and seats clean with warm detergent solution and then sanitize them with 200 ppm. quaternary ammonium solution. Replace plugs in lines.
4. Rinse system with fresh water for approximately 10 min. at 120-140 deg. F.
5. Sanitize with 200 ppm. hypochlorite germicide for 10 min.

In some experimental work, a 200 ppm. quaternary ammonium solution was circulated following cleaning, with a 200 ppm. hypochlorite rinse used just before beginning plant operations. The purpose of quaternary sanitizer for valve plugs and seats was to minimize chances of corrosion of these parts.

In early trials the washing treatment consisted of daily alternate cleaning with the alkaline solution, followed by a water rinse and then an acid detergent solution. Subsequent studies indicated that, under the soft water conditions encountered, a properly balanced alkaline cleaner rendered subsequent treatment with acid detergent unnecessary. Use of an acid cleaner was therefore discontinued.

Water hardness was approximately 6 gr./gal. or 105 ppm., calculated as $CaCO_3$. This experimental cleaning procedure has also been used successfully in a milk plant with a water supply of 13 gr. hardness. Experiments included concentrations of cleaning compound in the detergent solution ranging 0.4-1.0 percent by weight. The acid detergent concentration provided a pH of approximately 4.0 in use dilution.

## Laboratory Methods

Since the Damascus plant is located about 90 miles from Oregon State College, it was not possible to make routine, daily swabs of the lines. The lines were swabbed once a week, and usually after a given set of conditions had been in effect for at least seven days. Non-absorbent cotton swabs measuring $\frac{3}{8}$x$\frac{3}{4}$ in. dia. were wound on $\frac{1}{8}$ in. brass welding rods. A surface of approximately 8 sq. in. was swabbed and the swab shaken 50 times in the diluent.

Specific inhibitors for hypochlorite and quaternary ammonium compounds were included in the diluent to assure a proper evaluation of bacteriological conditions. Azolectin in concentrations of 2.2g. per liter, emulsified with 15.6 ml. of Tween 80 was used to inhibit the quaternary compounds, and 80 mg. per liter of sodium thiosulfate was used to inhibit residual hypochlorite action.

Physical inspection was accomplished by examining several sections of the lines against a strong white light while wet and again when dry. A grease film was best seen by the formation of water droplets in a wet line, while other deposits were more obvious after the lines became dry.

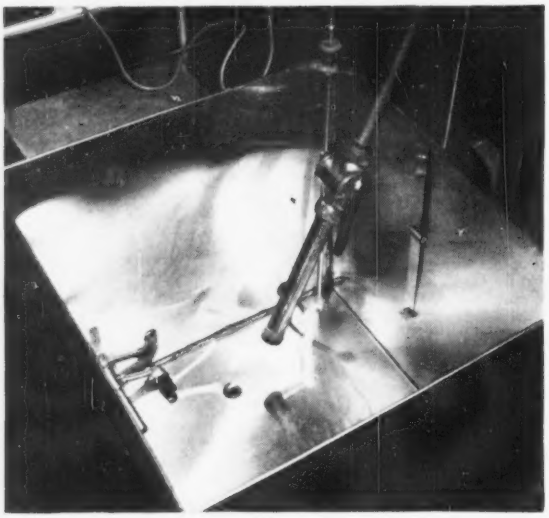
Each night cleanup personnel were requested to make a short physical inspection of several sections. The inspection report was filled in on a form with information on the type and concentration of cleaner used, along with other pertinent data. This report was stapled to the chart from the recording thermometer and served as a per-

**TABLE I—EFFECT OF CLEANER COMPOSITION** on Efficiency in the Recirculation System

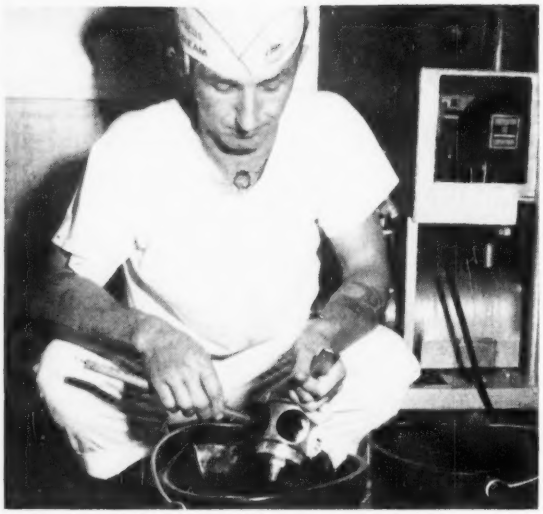
| Cleaner | pH of 1 Percent Solution | Effective Alkalinity* Percent | Wetting Agent Percent | Principal Alkaline Components | Other Ingredients | Effectiveness | Remarks |
|---|---|---|---|---|---|---|---|
| A | 12.40 | 17.5 | 10 | Caustic soda<br>Sodium metasilicate | Complex phosphate (20 percent)<br>Soda ash | Very satisfactory | Produced considerable foam |
| B | 12.55 | 23.0 | 3 | Caustic soda<br>Sodium metasilicate | Complex phosphate (20 percent)<br>Soda ash | Ineffective | Less foaming than A<br>Fat residues |
| C | 11.60 | 0.9 | 10 | Soda ash<br>Trisodium phosphate | Complex phosphate (30 percent)<br>Sodium metasilicate | Ineffective on fat deposits | Results poor |
| D | 12.5 | 15.5 | 3 | Sodium metasilicate<br>Caustic soda<br>Soda ash | Complex phosphate (10 percent) | Poor | |
| E | 12.4 | 14.4 | 3 | Sodium metasilicate | Complex phosphate (40 percent) | Poor | |
| F | 12.1 | 6.9 | 0 | Soda ash<br>Caustic soda | Complex phosphate (5 percent)<br>Sodium orthosilicate | Poor | Milkstone after 3 days |
| G | 12.3 | 6.6 | 5 | Sodium metasilicate | Trisodium phosphate | Poor | Heavy fat film |
| H | 12.2 | 4.9 | 5 | Sodium metasilicate<br>Soda ash | Complex phosphate (39 percent) | Poor | Heavy fat film |
| I | 12.35 | 19.0 | 0 | Caustic soda<br>Sodium orthosilicate<br>Soda ash | Complex phosphate (51 percent) | Poor | Fat film |
| J | 12.6 | 25.0 | 8 | Same as I plus sodium hydroxide and W. A | | Satisfactory | |
| K | 12.7 | 65.0 | 0 | Straight caustic soda | None | Poor | High ash residue |
| L | 12.3 | 0.9 | 2 | Sodium metasilicate | Complex phosphate (13 percent) | Poor | Fat residue |
| M | 12.8 | 15.0 | 1 | Caustic soda | Complex phosphate (5 percent)<br>Sodium metasilicate | Fair | |

* In this report, "effective alkalinity" is calculated as $Na_2O$ and serves as an index of concentration of high pH components in the cleaner. It may be regarded as that alkalinity above pH 11.8 or the approximate end point of trinitrobenzene. The term was originally suggested by Myers[9] as a measure of bactericidal alkalinity.

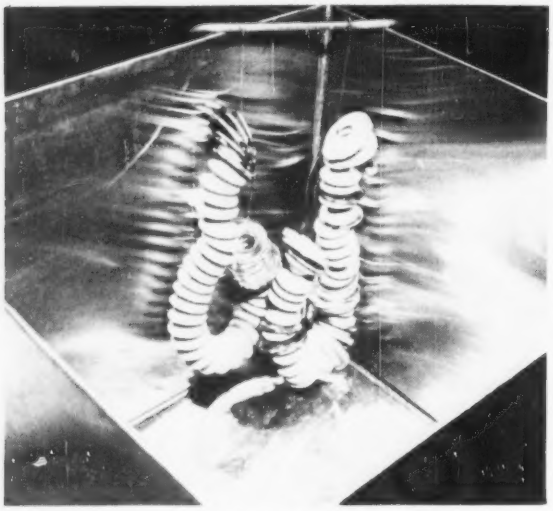
## Cleaning Steps . . . Comparative Sections



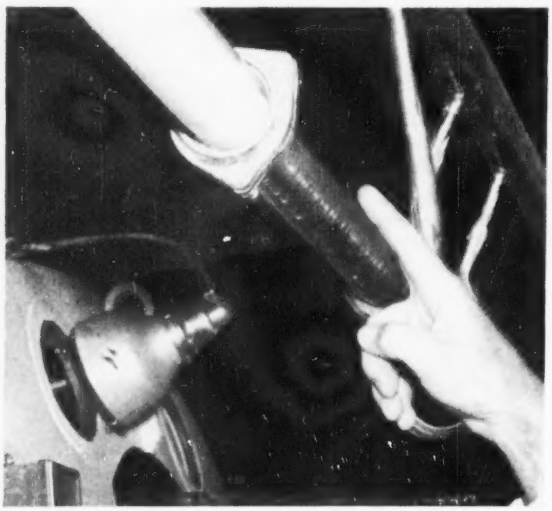
**CLEANING** solution is made up in circulation tank equipped with measuring stick to insure uniform strength, and thermostat and steam injector to maintain temperature.



**VALVE PLUGS** and seats were hand brushed with cleaning solution, sanitized with quaternary germicide, then plugs were replaced and entire system hot water-rinsed.



**RUBBER** and metal parts of bottle fillers were successfully cleaned by suspending in supply tank during recirculation of solution in plant piping system.



**GLASS** sections were inserted in the stainless steel sanitary piping system to enable comparative studies of cleaning properties of the two types of lines.

ment record of each individual cleaning procedure. The cleanup crew's nightly evaluation and report of the physical condition of the lines was substantiated with a careful weekly examination of lines by project personnel.

### Results

**Cleaning Equipment.** The first step in the study was to develop an efficient unit to be used for recirculating the detergent solutions. It was necessary that a circulation pump and tank be constructed into a unit which would maintain continuous and automatic control over the cleaning process with a minimum of attention by plant personnel. It was further required that the unit be portable so as not to interfere with other plant operations.

In the preliminary experiments a drop tank from a plate cooler was used. This required excessive time to set up each night, and did not accurately control and regulate temperature of the solution throughout the lines.

Company engineers then fabricated a stainless steel tank with a thermostatically controlled steam injection unit for heating (see accompanying special panel). In addition, a recording thermometer was used to provide a permanent record of time and temperature covering each daily operation.

This tank, maintained on wheels had an overall height of 45 in. and a capacity of 150 gal. The circulation unit has shown unusual efficiency in cleaning the sanitary piping system of this plant. A stainless steel depth gage was constructed with short nibs to indicate volume of solution in tank.

Before such a gage was installed, considerable difficulty was encountered in uniformly controlling volume and cleaner concentration. A solution volume of at least 1.5 times the volumetric capacity of the lines was used during recirculation. In the case of the raw milk lines, a volume of 150 gal. was required. To insure filling the

**TABLE II—BACTERIA** in Valve Seats and Cores Are Influenced By Different Cleaning Procedures*

| Procedure | Raw Milk Lines | | Pasteurized Milk Lines | |
|---|---|---|---|---|
| | Standard Count No. Per Swab | Coliform Count No. Per Swab | Standard Count No. Per Swab | Coliform Count No. Per Swab |
| Valves not cleaned | 861 | 41 | 80 | 2 |
| Valves cleaned and sanitized before recirculation | 18.2 | 2.5 | 20 | 0 |
| Valves cleaned and sanitized after recirculation | 12.5 | 0 | 5 | 0 |

* Data represent averages of 18 swabs. Counts obtained by swabbing approximately 8 sq. in. of surface.

**TABLE III—RECIRCULATION CLEANING** Gave Constantly Lower Bacterial Counts Than Conventional Take-Down Methods*

| Method of Cleaning | Type of Count | Percent of Samples With Counts of | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0 to 10 Per Swab | 20 Per Swab | 30 Per Swab | 40 Per Swab | 50 to 100 Per Swab | 100 Per Swab |
| Recirculation** | Standard plate | 49 | 25.5 | 13.5 | 4 | 8 | 0 |
| | Coliform V.R.B. agar | 100 | 0 | 0 | 0 | 0 | 0 |
| Conventional** | Standard plate | 0 | 6.2 | 6.2 | 6.2 | 43.8 | 37.2 |
| | Coliform V.R.B. agar | 50 | 18.7 | 18.7 | 12.2 | 0 | 0 |

* Counts obtained by swabbing approximately 8 sq. in. of surface. Swabs were taken from both raw and pasteurized lines.

** Based on 102 swab counts for the recirculation cleaning method and 16 for the conventional or hand cleaning procedure.

**TABLE IV—LARGE SAVINGS** In Labor Were Effected When Circulation Cleaning Was Substituted for Take-Down Method

| Method of Cleaning | Time Required For Cleaning | | |
|---|---|---|---|
| | Raw Milk Lines | Pasteurized Milk Lines | Raw and Pasteurized Milk Lines |
| Take-down cleaning | 531 | 218 | 749 |
| Circulation cleaning | 112 | 61 | 173 |
| Difference | 419 | 157 | 576 |

complete system with solution, it was considered desirable to apply back pressure through the use of a partially closed valve at the outlet of the recirculating system. A gage was installed and 1-lb. back pressure maintained during all cleaning procedures.

**Cleaning Compounds.** In manual cleaning procedures, the mechanical friction used may be relied upon to remove a major portion of the adhered soil. In recirculation cleaning, however, the rinse and detergent solutions are the only agents used in removing milk residues. For this reason the detergent must be of unusual efficiency. In the course of this study the combined residues of whipping cream, skim milk, buttermilk, chocolate milk, and other normal milk plant products, had to be removed without the benefit of mechanical scrubbing.

A total of 14 cleaners of widely varying composition was employed in the study under a variety of conditions in order to determine the essential characteristics of efficient recirculation cleaning solutions (see Table I). Although other cleaner concentrations and temperatures were used, these data were selected from results obtained with 0.4 percent cleaner at a temperature of 170 deg. F. It was noted that an efficient cleaner would provide satisfactory results at 0.4 percent, and elevating the concentration of ineffective cleaners to levels as high as 1 percent did not noticeably improve the cleaning properties of the solutions. The use of temperatures below 170 deg. F. resulted in fat film build-up in some lines.

A high degree of alkalinity* and at least a moderate amount of wetting agent appear to be essential properties of effective recirculation detergent solutions. As an example, Cleaners A, B, D, and E were of approximately the same pH, but differed in wetting agent concentration. Cleaner A, with 30 percent wetting agent, was extremely effective, while Cleaners B, D, and E with 3 percent wetting agent, permitted fat residues to accumulate. On the other hand, Cleaner C contained 10 percent wetting agent but lacked sufficient alkalinity to produce the desired results.

Some results indicated that the type of wetting agent affected general efficiency of the cleaner. In addition to high wetting action other essential requirements of wetting agents in such cleaners are stability at high temperatures and in presence of highly alkaline cleaner components.

**Temperature.** In washing procedures, temperatures varying from 130 to 175 deg. F. were used. An attempt was made to select the minimum temperature, which, with an efficient cleaner, would assure removal of all types of soil.

As raw and pasteurized milk lines were circulated in separate operations, it was possible to vary temperatures on both systems. It was noted early in the study that, although the velocity on the raw milk side was slightly lower than that on the pasteurized milk side, the raw lines were cleaned satisfactorily at lower temperatures. With a suitable cleaner, most of the metal raw lines were maintained in satisfactory physical condition for four or five days, using temperatures as low as 130 deg. F. Later it was noted that the residues of cream in the lines required higher temperatures for cleaning than those of whole milk.

Lines on the pasteurized milk side which carried whipping cream or chocolate milk were not satisfactorily cleaned until a temperature of 170 deg. F. or higher was used. It is possible that a product in which the milk emulsion has been disturbed, or other non-milk fat added, provides a more tenacious residue, and higher temperatures are needed to satisfactorily remove it.

**Velocity.** It has been suggested that a minimum solution flow of 5 ft. per sec. be maintained in circulation cleaning. Velocities used in the study varied both above and below this figure. Variations were due to the fact that the same equipment was used to circulate solutions in two separate systems and each system held sections of 2- and 2½-in. piping.

Velocities as calculated from the time required to fill a 10-gal. can were as follows: Raw milk side, 2-in. line, 5.2 f.p.s.; 2½-in. line, 3.4 f.p.s. Pasteurized milk side, 2-in. line, 7.5 f.p.s.; 2½-in. line, 4.7 f.p.s. As nearly as could be determined, these variations in velocity did not influence cleaning efficiency.

**Inclusion of Glass Lines.** Glass lines (2-in.) were spaced intermittently at maximum and minimum elevation and other selected locations in the piping system. They were arranged so that all of the products handled in the plant were required to pass through at least one and usually two or three of the sections.

* As used in this report, the term "effective alkalinity" is an index of the concentration of high pH components in the cleaner. It may be regarded as that alkalinity above pH 11.8 or the approximate end point of trinitrobenzene. The term was originally suggested by Myers (see references) as a measure of bactericidal alkalinity.

Other glass sections were included in delivery lines to surge tanks, which were located about 15 ft. above the average piping level. As this was the highest point in the system, it was possible to maintain continuous inspection of solution flow during cleaning and of milk flow during processing at a point in the lines considered most difficult to clean.

Despite the physical limitations of glass piping, it appeared to offer a definite advantage in the ease with which it was cleaned. One section of glass piping was located so that both whipping cream and chocolate milk were pumped through it. This glass section was cleaned satisfactorily at temperatures as low as 140 deg. F. with all but one of the cleaners used (Cleaner K), while closely adjacent metal sections of the same line were successfully cleaned only by raising the temperature to 170 deg. F. and using either Cleaner A or J.

Inclusion of glass lines also illustrated an engineering problem which previously has not received much attention. It was noted that lines that did not have uniform pitch held a shallow layer of milk. When the lines were used only intermittently, residue milk was often held at room temperature for periods of several hours. It would thus appear that proper sloping is an essential feature to be considered in the installation of sanitary piping, irrespective of the planned use of recirculation cleaning.

When milk was held in the lines long enough for the fat emulsion to break, a fat layer formed. After draining the lines, films of fat appeared as streaks down each side of the pipe, and this residue was difficult to remove from metal lines, especially when improper cleaners were used.

**Gaskets.** Due to equipment limitations, it was not possible to make an extensive study of the use of different gasket materials. However, a limited number of observations were obtained using Neoprene and Teflon.

Neoprene gaskets have remained in place for periods as long as 3½ months with satisfactory results. Scrapings from the gasket surfaces indicated them to be bacteriologically satisfactory, and some have appeared free from any contamination. Once the union is broken, however, the gasket must be removed and replaced to prevent leakage of milk at the joint.

Both Neoprene and Teflon gaskets have been satisfactory when reasonable care is observed in inserting them between joints. However, Teflon has shown some tendency toward discoloration over long periods of usage.

**Cleaning Valves.** Various recommendations have been given on cleaning and sanitizing valves, and there has not been general agreement on the necessity for any specific valve cleaning procedure. For these reasons, a simple study was made using three modifications: (a) Valves were left uncleaned; (b) cleaned and sanitized before recirculation of the detergent; and (c) cleaned and sanitized after recirculation. Results of the study appear in Table II.

The data show that it is necessary to disassemble and hand wash with brush and cleaner solution and then sanitize the valves. And the best time for this appears to be after recirculation of the detergent.

For duration of the study, valves were properly cleaned and sanitized by two plant men using a detergent and a 200 ppm. quaternary sanitizing solution in rubber buckets. They were instructed to remove each valve from its seat, scrub it, sanitize it, and return it to its customary place. This procedure worked quite effectively, and valves remained in a satisfactory condition. Quaternary solution was employed for sanitizing valves to minimize opportunity for corrosion.

### Significance of Results

As can be seen from the information presented in Table III, bacteriological condition of circulation-cleaned lines has remained excellent at all times, regardless of the cleaner used, and has been surprisingly independent of the physical condition of the lines. In some instances, sterile swabs were taken from areas of definite fat films. The highly alkaline cleaners and the high temperatures permitted in this type of cleaning appear to assure a uniformly low bacterial count.

Although relatively few swab counts were made on lines cleaned by conventional methods, results (Table III) and Damascus laboratory records over the past several years suggest that the general bacteriological condition of recirculation-cleaned lines was definitely superior to that of hand-cleaned lines. The only time coliform organisms were detected on line swabs during the entire twelve months of study was after a conventional "take down and brush" procedure was used.

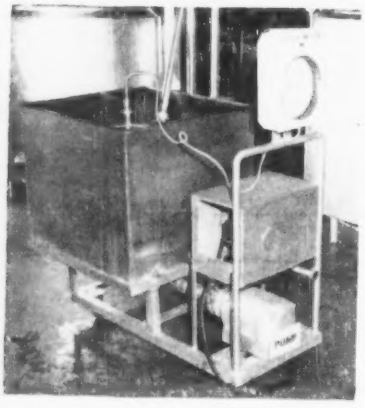
A common opportunity for such contamination with coliform bacteria is the use of the same wash tanks and brushes for both raw and pasteurized lines. Such recontamination is eliminated in recirculation cleaning, since the cleaning tank and pump are effectively sanitized by the heat and alkalinity of the detergent solutions used in this method.

Due to the extremely low bacterial population in recirculation-cleaned lines, application of quaternary ammonium solutions did not produce an additional improvement, and use of these agents was discontinued after about 3½ months. However, circulation of quaternary compounds did not appear to produce an undesirable film on the glass lines.

**Labor Comparisons.** Average time spent by the cleaning crew in daily disassembling, hand washing, and reassembling of the pipe lines was compared with time required for recirculation cleaning. Labor saved by using recirculation cleaning was 576 min.,

(*Turn to page 176*)

## Simple Devices Turn the Trick



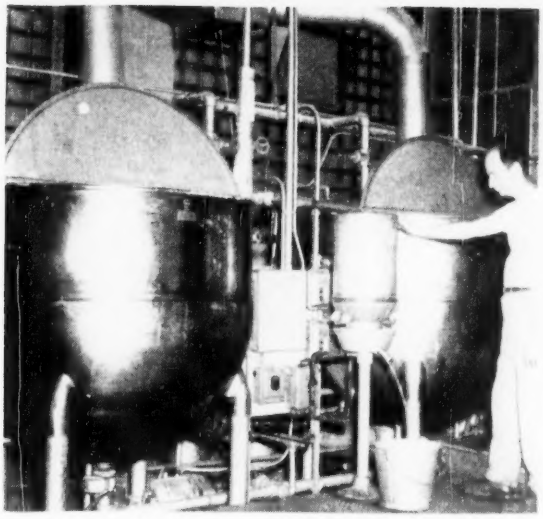
**Shop-Rigged Equipment Aids CIP Cleaning**

An easily constructed portable unit has made a major contribution toward the goal of efficient and thorough cleaning of pipelines at Damascus Milk Co.

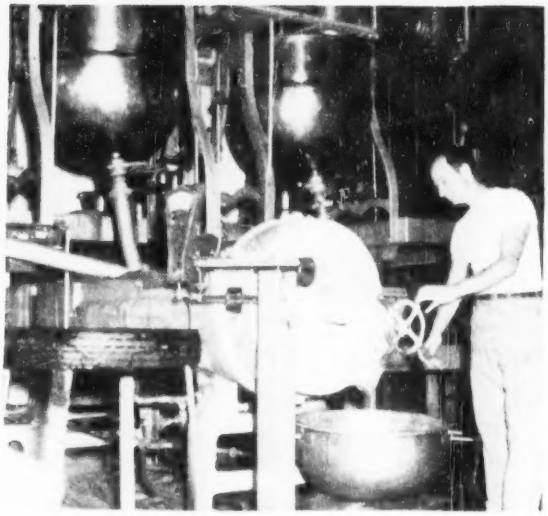
It is comprised of two basic parts—a 150-gal. stainless steel tank and a stainless circulating pump—mounted on an angle iron base.

Tank is equipped with a thermostatically controlled steam injector, that automatically maintains cleaning solution at desired temperature of 170 deg. F., and a recording thermometer that serves as a reference for cleanup personnel and provides a permanent record of each day's procedure. A calibrated gage, fastened to the inside of the tank, permits accurate measurement of water to insure correct cleaning solution strength.

Pump is of sufficient capacity to provide a velocity of approximately 5 ft./sec. through pipelines being cleaned. And a valve is installed in the return line to maintain a back pressure of 1 lb./sq. in.



IN THESE 3,600-lb. kettles, bulk ingredients are pre-mixed. While one kettle is filled, other is emptied.



FUDGE is cooked in kettles (top), then is fed to batch mixer (center), where other ingredients are added.

## *Improved Candy-Handling Technique*

# Doubles Output on Fudge Line

Large confectioner pre-mixes in large tanks to assure 1,000-lb./hr. flow to cooking kettles, then feeds product directly to batch mixers

**FE STAFF**

Through introduction of improved handling, output has been jumped more than two-fold in the fudge department of Just Born's, Bethlehem, Pa.

Hourly production now exceeds 1,000 lb. And what's more, only two workers turn out this volume.

These are the significant strides:

**▶ Metering liquid sugar and corn syrup directly into pre-mix tanks, thus abolishing former batch-scaling.**

**▶ Preparing bulk ingredients in two pre-mix tanks to assure continuous flow into batch cookers.**

**▶ Employing automatic temperature controllers to terminate the cook in the kettles.**

**▶ Gravity-feeding product directly from cookers into a horizontal mixer to eliminate delays.**

Following are details of these production-speeding developments:

First, decidedly smoother production was attained by metering in the sweetening agents—liquid sugar and corn syrup. Both ingredients go right into two stainless steel, 3,000-lb. capacity, jacketed pre-mix tanks.

Also added here are milk and a portion of the hydrogenated coconut oil. After the milk is pumped into the tanks, the empty cans are inverted over the bowl of a spray-cleaning water fountain, thus rinsing away milk adhering to the inside of the containers. This diluted milk is recovered by draining into a receptacle and then dumping into the tanks.

In the next change—setting up a procedure for alternately filling one tank and emptying the other—the ingredients are mixed with vertical type agitators and pre-heated to 120 deg. F. They are then pumped to 550-lb. capacity, stainless cooking kettles.

Installation of automatic temperature controllers for finishing the cook—the third notable advance—then brought a big improvement in temperature control technique. It is now possible to start cooking by push-button. The operator need only fill and empty the cooking kettles. By controlling the cooking of the fudge, production is also increased.

The kettles are equipped with vertical-type agitators that mix the product as it is cooked to about 242 deg. F. Then after the fudge is finished, the steam is automatically turned off and the exhaust valve is opened to drain steam and condensate.

The fourth change for better efficiency involved installation of a jacketed Hottman batch-mixer, equipped with twin worm-screws and an automatic time-controller. Here, cooked fudge is alternately introduced from the cookers. Chocolate liquor, butter, flavor, and additional hydrogenated coconut oil are added.

After 1½ to 2 min. of mixing—depending upon the type of fudge—batches of approximately 90 lb. are scaled into a copper bowl riding on a dolly. The fudge is then poured on cooling slabs surfaced with oiled kraft paper. These slabs have 1-in. removable metal side bars that are coated with coconut oil to prevent fudge from sticking to them. The tables are lightly sprinkled with sugar to facilitate removal of the paper.

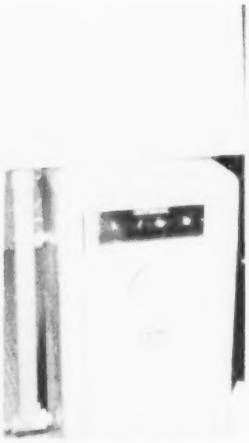
Fudge is spread out evenly over the tables and then, before cooling, it is "roughed" with a pallet-knife. Steel roller knives now cut the candy to proper size. Paper-backed lots of the candy, approximately 7-lb. each, are now torn off, using the edge of the table as a ripping edge. Packing follows.

# Panorama Of New Beverage Units

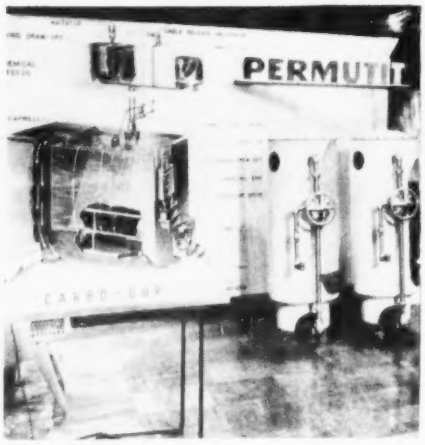
Labor saving and improved sanitation feature equipment viewed by bottlers at Atlantic City Exposition

**AUTOMATIC** carton opener forms 6-bottle carriers at speeds up to 60 per min. with part time service of one person.—Atlanta Paper Co., Atlanta, Ga. (88A)

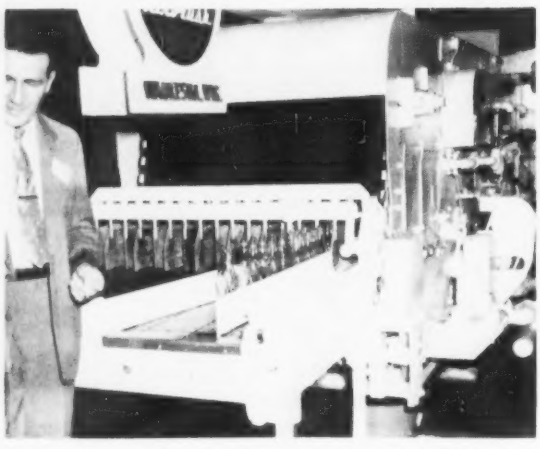
**MOTOR-IN-WHEEL** stacker gives maximum maneuverability in congested areas. Elevates 2,000 lb. loads 130 in.—Clark Equipment Co., Industrial Truck Div., Buchanan, Mich. (88B)



**ELECTRONIC** solution control and feeder maintains detergent strength in soaker washers.—The Diversey Corp., Chicago (88C)



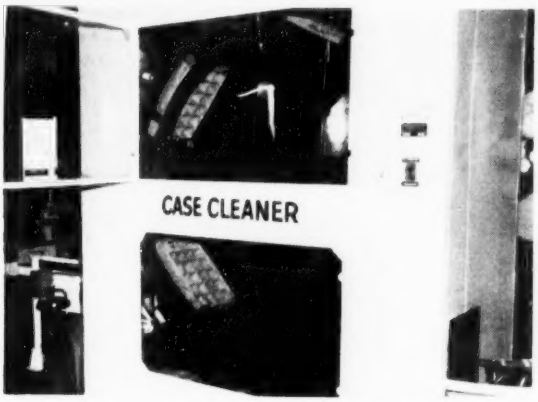

**PACKAGED** unit for treating beverage water, consisting of bottling precipitator, neutralite filter, and carbon purifier, was displayed graphically at booth of The Permutit Co., New York City. (88D)



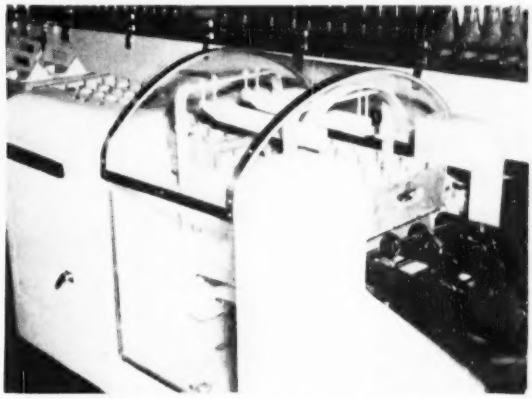
**BOTTLES** are automatically placed in pockets of this new washer. Attached unscrambler-loader is fed from uncaser.—Michael Yundt Co., Waukesha, Wis. (88E)

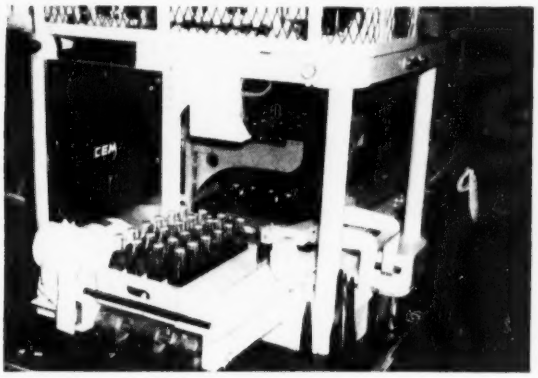
**NEW STEAM COIL** construction provides economy in soaker operation, permits fast, easy inspection and repairs.—The Heil Co., Milwaukee (88F)

## Case Cleaners, Loaders, Unloaders, Bottle Bander



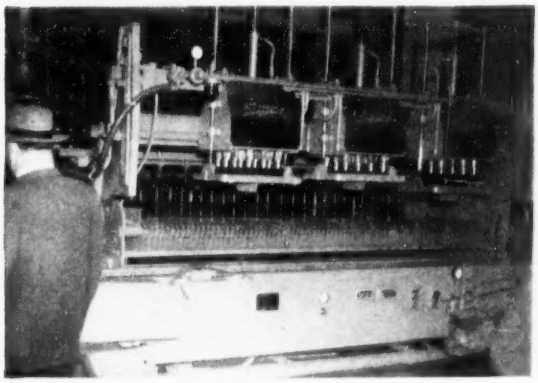

**CASES** are automatically cleaned by these two units without removal of carriers. In unit on left, entering case moves on chain conveyor to top of circle, where it meets jets of compressed air, then slides down to discharge. In unit on right, each case is centered on conveyor section which revolves 180 deg. to empty out dirt. Section then moves to starting position, where case is ejected to gravity conveyor. Requires ½ hp. motor, 1 cfm. air at 60 psi.—Respectively, Standard-Knapp, Portland, Conn. (89A); and Miller Hydro Co., Bainbridge, Ga. (89B)



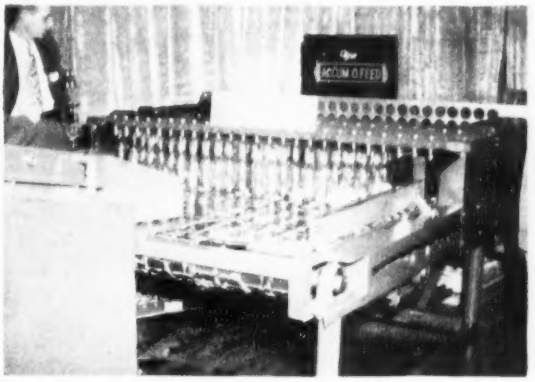


**BOTTLES** are cased 300 min. or more by new unit that accumulates case lot, positions it over loading station, then gently lowers it into case. Automatic case adjuster provides continuous handling.—Crown Cork & Seal Co., Machine Sales Div., Baltimore (89C)

**CELLOPHANE** bands are applied to bottle necks and caps at speed of 65 per min. by automatic banding machine. It cuts material from roll, forms it into desired size, then seals it around neck of bottle.—Economic Machinery Co., Worcester, Mass. (89D)



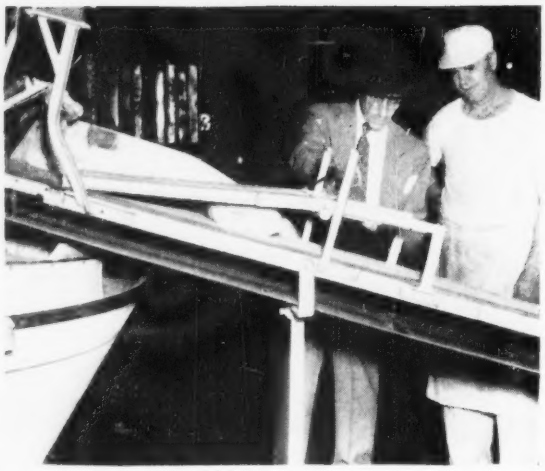
**THREE-UNIT** Dumore uncaser, attached to feed table of specially constructed soaker-washer, is operated by washer mechanism, thus eliminating extra motors, controls.—Geo. J. Meyer Mfg. Co., Cudahy, Wis. (89E)




**UNSCRAMBLER TABLE** with special feed that aligns and places bottles directly into soaker pockets. Handles 6-oz. to 1-qt. size bottles, 8- to 32-wide soaker.—Bottlers Appliances Inc., Salisbury, N. C. (89F)

**Want more information about any items in this picture article? Just circle key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to the inside back cover.**

**1** SYSTEM for handling flours has been designed for efficiency and sanitation. The conveyors (A) and (B) are easy to dismantle for inspection and cleaning purposes.



**2** PRE-ROUNDER was constructed to handle 3½-lb. doughs prior to going to conventional rounder. Device comprises two boards, mounted directly over conveyor.

# Hearth Baking Goes Modern

By installing special mechanical equipment and devices, baker increases output of flavorsome bread 15 times . . . Improves sanitation and quality

**JOHN V. ZIEMBA**
Assistant Editor, "Food Engineering"

Until recently, production of hearth-baked breads—plain, caraway, and pumpernickel ryes—has been on a small-volume basis and has entailed a considerable amount of hand labor.

Some small bakers of these crispy, fine flavor breads then began taking steps to get around the production problems by switching to mechanized equipment. And one bakery particularly, Henry S. Levy & Son, Inc., of Brooklyn, went even further. Special devices were developed in this firm's machine shop to handle unusually heavy doughs—3½ pounders—in order to keep pace with the automatic equipment feeding to the specially designed traveling tray type hearth oven.

**Under the astute planning of Samuel Rubin, vice-president and general manager of this progressive bakery, operations have been so streamlined that output has now been increased about 15 times over former manual methods.**

**Hourly production of sliced, heel-less 1-lb. loaves currently has reached the 4,200 mark. In short, the output is already approaching the rate for panned white breads (6,000-plus) achieved on continuous lines in push-button bakeries.**

And to move this production to 5,500 retail stores in the metropolitan area, Levy's distribution facilities had to be quadrupled. There are now 60 one-ton trucks delivering the baked goods in place of the former 30 half-tonners.

To augment its line of hearth breads, this bakery went one step further. It developed a new hearth-baked white bread (Oven Krust), and this loaf has already won widespread acceptance.

## Handling 3½-lb. Doughs

Equipment had to be modified in most cases to handle the 3½-lb. doughs, and some units even had to be company-built. These large doughs are loaded into special tray-type pans to reduce the amount of heels in the sliced bread. For one thing, the tray flattens the ends of the loaves, thereby reducing size of heels. And for another thing, there are, of course, only two heels to each 3-lb. (final weight) loaf prior to cutting, instead of six to three 1-lb. loaves.

The flour-handling equipment has been modernized to speed up movement of flours to the mixers and to simplify sanitary maintenance. All conveyors are designed to permit easy access to the inside for inspection and cleaning. Bucket elevators and horizontal worm-screw conveyors have easy removable panels, which are secured by wedge-type clamps and sealed with rubber gaskets. By merely removing these clamps, panels come apart and the conveyors are purged of flour dust by a high-pressure air hose.

The automatic gyrating sifter also has easy-to-remove thumb screws for quick dismantling and cleaning.

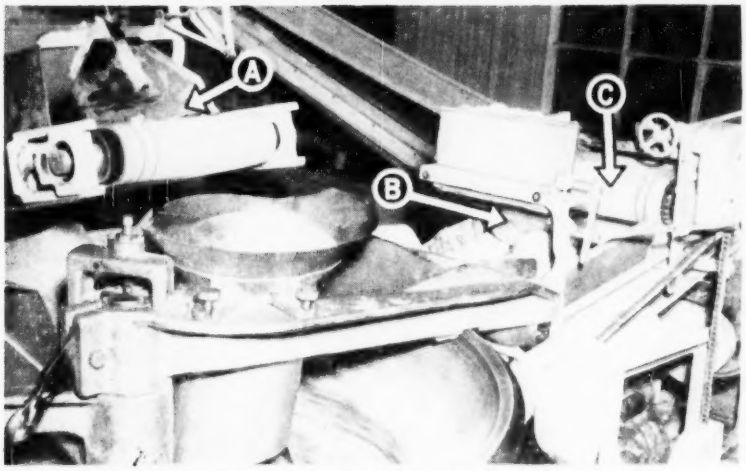
The conveyors carry flour from two cabinet-type blenders—one of which prepares a blend from three flours and the other from four—to four company-designed metal storage bins. A total of 450 bags of flour is held in three bins and 300 bags in the fourth.

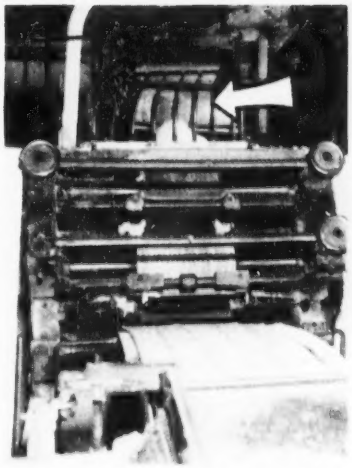
## Versus Infestation

All recesses in the bins, where flour might lodge and breed weevils, have been eliminated. Bottoms are sloped to prevent build-up of flour, prime source of insect infestation. Also, Syntron vibrators at the bottom of the three small bins keep the flour moving along. A rotary, finger-type agitator inside the fourth bin prevents the flour from arching over the discharge conveyor.

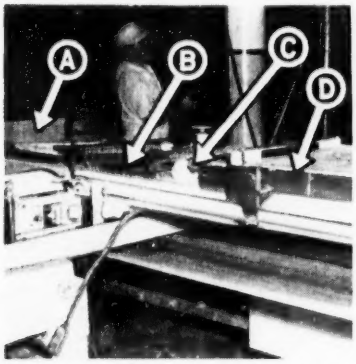
Engineering changes associated with uniformity of quality and production efficiency included installation of automatic flour scales, high-capacity mixers, and a dough-trough hoist.

To assure accuracy in feeding two

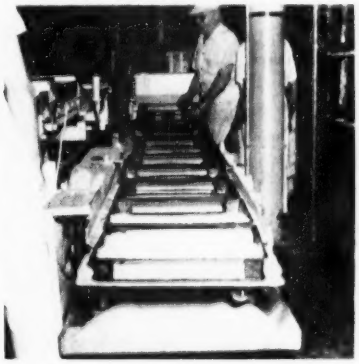


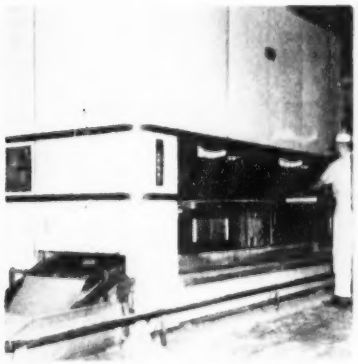
**3-4** DOUGH (photo above) strikes paddle (A) which actuates counter. When coming from rounder, dough gets complete coating with flour by piece of belt (B). It then goes through compressing belt (C). Right photo: From overhead proofer, dough goes to sheeter. Grill (arrow) serves as a safety device. When it's opened, machine automatically stops.



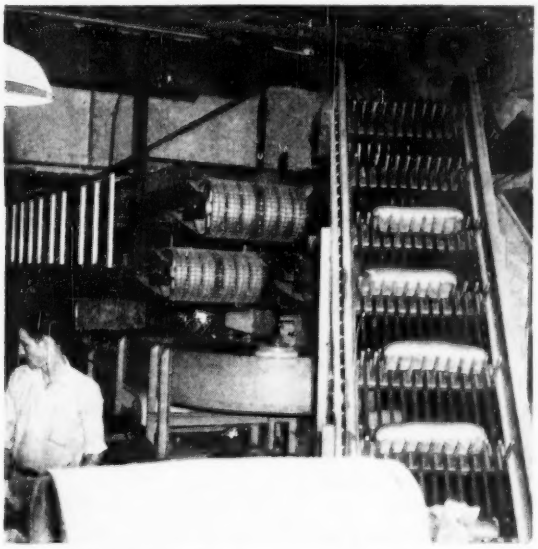

**5** AT MOLDER, corn meal from hopper (A) is dusted on boards. Dough is curled (B), then formed into loaf as it passes through special extenders (C) and (D).



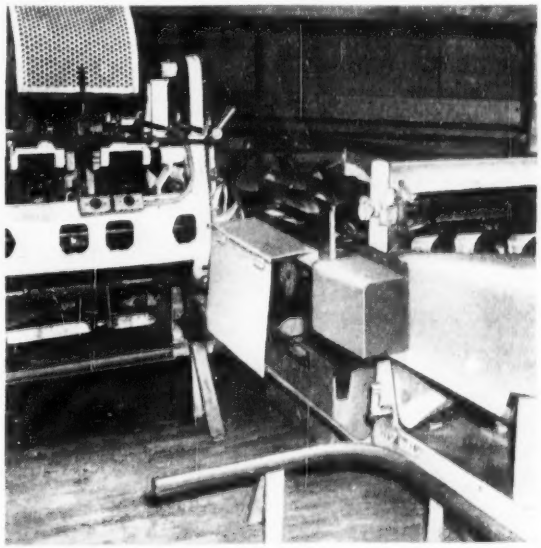
**6** SPECIAL panning line is adjacent to molder. Dusted boards travel on conveyor. Metal frames are placed on boards to accommodate two 3½-lb. dough loaves.



**7** THIS is the 40-ft. tray-type oven equipped with soapstone hearths to assure mellow, uniform bake. Finished loaves automatically discharge onto conveyor.



**8** CONTINUOUS cooler was company-built. Loaves are flight-conveyed to double-tier cooler, which consists of twin 200-ft. wire-mesh conveyors.



**9** LOAVES finally go to automatic slicer. Heels are removed. And sliced bread is stacked into three 1-lb. loaves, which are then machine-wrapped with wax paper.

major ingredients—flour and water—a traveling, electrically controlled flour scale and water meters have been provided. Pre-set to measure automatically pre-determined quantities, both devices eliminate the human error factor in weighing of these ingredients and thus assure uniformity in product quality.

In addition to a 1,200-lb. capacity mixer, three 2,400-lb. stainless steel units for white and rye doughs have been put in to raise production. The smallest unit is now used to prepare sour rye doughs. Since constant mixing temperature is important from a quality standpoint, the mixers are water-jacketed. Also flush-type indicating thermometers on the front of the mixing tanks aid operators in controlling temperatures. Electric timers regulate the drive motor and automatically time the mixing.

### More on Sanitation

Special sanitary features have been incorporated in the new high-volume mixers. Stuffing boxes are hydraulically moved to facilitate cleaning and inspection behind the agitator, and large openings in the frame of the mixer permit easy access to these units. The mixer bowl is lined with polished, stainless steel-clad sheets, and the canopy cover is also stainless clad. Back lip of the mixer tank is equipped with a stainless steel scraper for removing dough adhering to the underside of the canopy cover. The rear of this tank is rubber-sealed. And there is a drip trough for collecting moisture from the cover when the tank is tilted.

An electric hoist is now employed to eliminate the old back-straining task of hand-scooping sections of dough from troughs to mixers. Each trough is raised above the mixer, and the dough is dumped into the unit. Dumping is also facilitated with a quick-opening end gate on each dough trough.

In the fermenter, doughs are dumped from troughs through a stainless steel, floor level chute to a 3-pocket Duchess divider on the floor below. This system does away with the need for hoisting the dough trough to feed the hopper of the divider.

Fermentation takes place in an insulated room, where the temperature and relative humidity are automatically controlled—another measure to assure uniform quality baked goods.

### Something New in Rounding

A specially designed pre-rounder has been installed on the canvas-belt conveyor carrying the 3½-lb. doughs from divider to rounder. This is a simple device consisting of two 1-in.-thick plywood boards, which are mounted directly over the belt (see Photo 2). The first length (1 ft.) is permanently fixed about 8 in. above the belt by four metal supports, while the second length (2½ ft.) inclines down to the belt. Springs attached to the latter serve to return it to a resting position on the belt after each dough travels through the pre-rounder.

Both boards are hinged to a Teflon-coated 1-in.-dia. wooden rod, so as to permit the longer board to rest on the belt. Bottoms of both boards are also Teflon-coated to prevent dough from sticking to them.

The weight of the longer, inclined board reduces the speed of each piece of dough, causing it to rotate on the fast-moving belt and take the shape of a partially rounded ball.

Doughs are then automatically counted as a production-volume check as they go to the rounder. Each ball of dough strikes a paddle-shaped metal plate mounted on a spring-operated rocker arm that actuates a counter. As the dough passes the plate, it drops into a vertical, cylindrical chute that feeds it to the rounder. Meanwhile, the plate springs back into position, ready for the next piece of dough.

Because the doughs handled are of larger size, they must spin around twice in the rounder. Teflon-coated spiral guides inside this unit prevent dough from sticking to it, thus increasing throughput.

Balls of dough now emerge onto a canvas belt conveyor, where they are automatically dusted with flour. To assure a uniform coating of flour, each ball is rotated while traveling on the conveyor. Employed is a heavy 1-ft. canvas belt, attached to the mechanical flour duster. As the dough hits this vertical belt, it rotates sufficiently to be completely covered with flour.

Leaving the duster, the dough continues to an adjustable company-made compression belt, which flattens it into a disk. An inclined, double-belt "squeeze" conveyor—two belts traveling in the same direction with dough between—carries the dough to an overhead proofer. The dough makes eight passes through the proofer. Total proofing time is 7 min.

### Novel Molding System

Notable efficiencies have been engineered into the company-designed molder-panner. Speed of the dough traveling on an inclined belt from the proofer is reduced for proper feeding to the sheeter by a small vertical canvas belt. Two sets of horizontal rolls then form the dough into a sheet.

Mounted over the rolls and hinged to the framework of the sheeter is a metal grill, which serves as a safety device. When the grill is opened for cleaning purposes, a limit switch breaks electrical contact with the sheeter and conveyors, causing the unit to stop operating.

A high-speed conveyor now transfers the dough sheet to a slower moving belt that feeds it to the molder. Here, an adjustable metal plate mounted over the conveyor positions the dough for delivery to the unit.

Molding is a two-step operation, involving curling the sheet of dough and then extending it into the form of a loaf.

A simple device has been rigged up in the company's machine shop for curling the dough sheet. It comprises a flexible 2½-ft. length of wire-mesh ing arranged to lie on top of the molder conveyor (see Photo 5). Attached to this wire-mesh strip are two ¾-in. steel bars, which are parallel and chained to each other. As the sheet of dough rides along on the conveyor, the dough strikes the weighted wire belt, which automatically curls it into a preliminary loaf.

Two simple devices have been incorporated by the company to further shape the curled dough into a loaf. A preliminary extender—a V-shaped plywood board mounted about 6 in. above the traveling belt—begins lengthening the dough. Then the dough feeds to a final extender that continues to roll it to shape. The latter comprises an adjustable, 3½-ft. metal plate, which is also mounted directly over the conveyor.

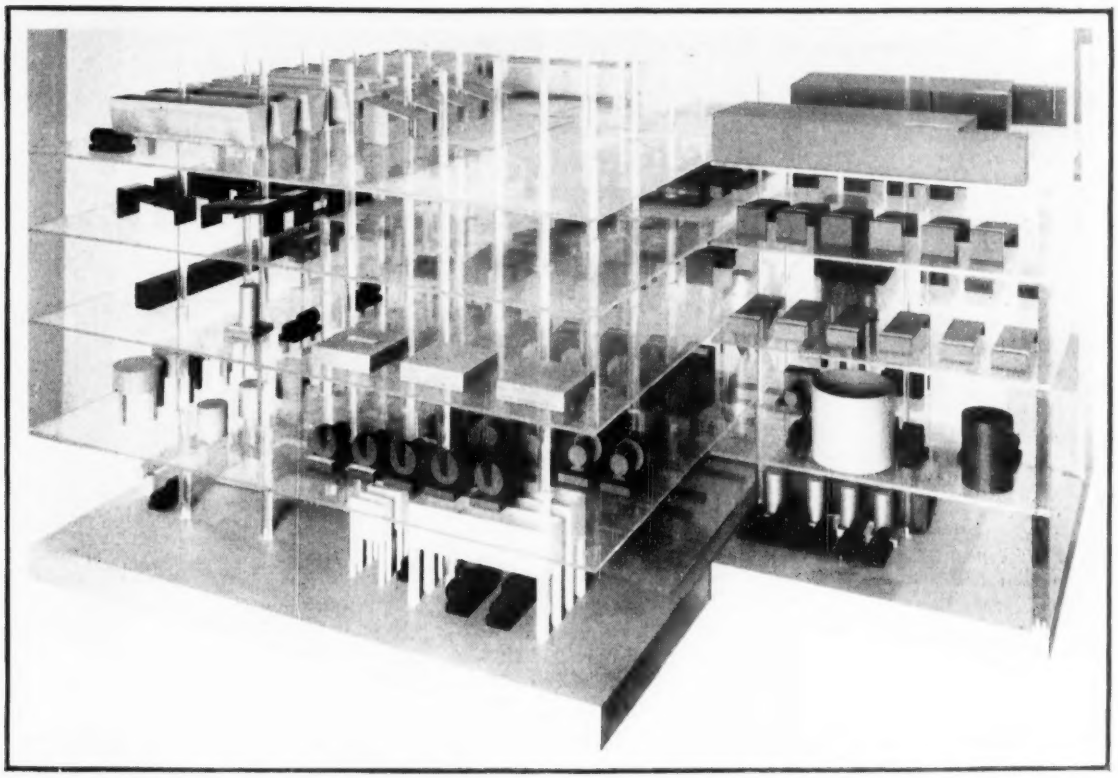
A specially designed, semi-automatic line has not only made panning easier, but also faster.

The panner in action: From a hopper, corn meal is intermittently dusted on 18 x 22 in. coating boards. These boards are also intermittently fed from a magazine onto a chain-belt conveyor. Feeding of the boards is controlled by an internally operated belt switch, which is actuated each time the panned dough is removed from the discharge end of the conveyor.

As each board is carried along the belt, a worker places a rectangular metal frame over it. Two 3½-lb. doughs are then loaded onto each framed board, and next the board, frame, and loaves are loaded onto racks, which are then rolled into a 24-rack proof box. Here doughs are proofed 1 hr. at 95 deg. F.

Doughs are now loaded into a 40-ft. tray-type hearth oven, the boards first being slid out from the metal frames containing the loaves. Soapstone (1½ in. thick) is used for the hearth to assure a thorough, mellow,

(Turn to page 146)



**PLANNERS'** table-size millhouse—62 in. long, 43 in. wide, 31 in. high—reproduces all five stories of the actual building and equipment in ½ in.-to-1 ft. scale. Floors and columns are of Lucite, equipment miniatures of Lucite and wood. Raymond Weilgus, of Chicago, fabricated the models.

## *Plastic-Model Plant, Midget Equipment Make—*

# Process Revisions "*Come Alive*"

Made to handy scale size, miniature irons out "bugs" in difficult modernization project at American Maize . . . Costly mistakes nipped before they can bud. Technical man-hours conserved

**FE STAFF**

Complete modernization of a process while it is in full production is one of the toughest projects that any food company can undertake.

While the big job of replacing machinery and piping "on the run" has its own special headaches, the knottiest problem usually involves getting everyone concerned properly coordinated on the project. Practically every type of plant personnel is in on the metamorphosis—and unless each is fully aware of what is going on, confusion can reign supreme.

American Maize-Products Co., facing this problem in the modernization of its complete Hammond, Ind., millhouse, came up with a dramatically simple technique to ease this plight—a finely detailed plastic scale model of the millhouse and its equipment.

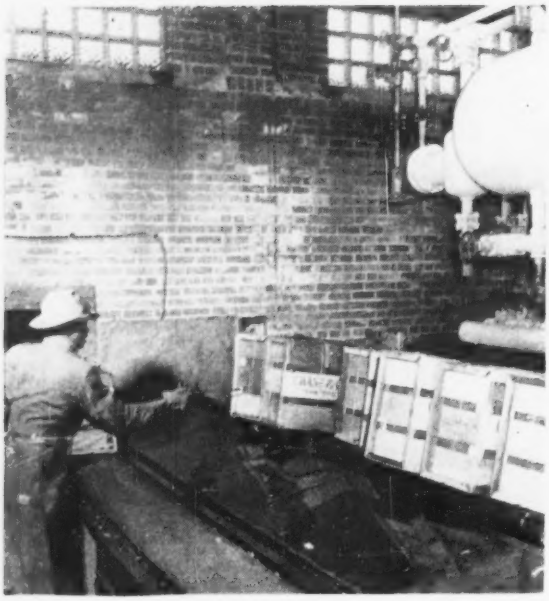
Not only has this miniature given personnel a vivid, easy-to-understand perspective of all changes, but it has also proved of extra worth on three counts:

**It has provided a heretofore-untapped source of practical suggestions from non-technical employees not familiar with blueprints. It has also afforded new personnel a comprehensive and rapid review of past, present, and future process changes. And it has saved valuable executive and technical man-hours by the "proving" of new ideas before they are incorporated into planning charts.**

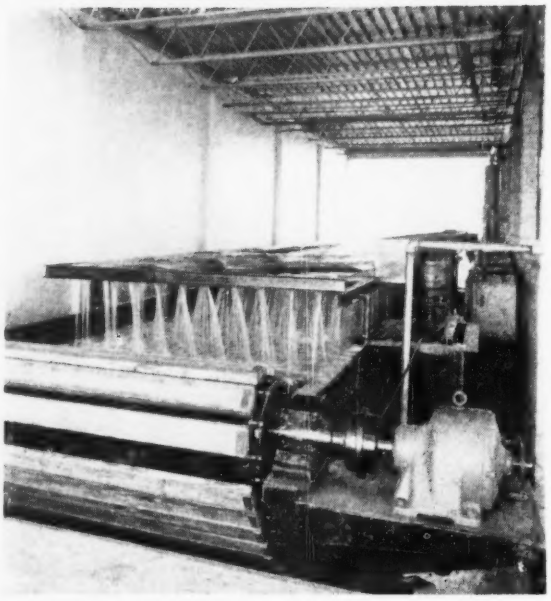
Initially, excellent plans of process and floor arrangements were drafted, suggestions and ideas then exchanged, and the blueprints revised to keep pace. But it was soon found that when managers, superintendents, department foremen, chemical engineers, sanitarians, maintenance workers, and coordinators got together, a meeting of the minds was well nigh impossible, since each visualized process changes differently, depending on his individual background.

In short, the many necessary steps involved in the piecemeal reconstruction vastly complicated any plan of evaluating by simple surveying of two-dimensional prints. Visualization of the third dimension was lacking—the relationships of the five floors to each

(Turn to page 173)



**CRATES OF CELERY** are removed from cooling unit in which they have been submerged in 33-deg.-F. water for ½ hr. Conveyor (front) moves them to loading.



**CORN AND ESCAROLE** cooler sprays ice water (2,000 gpm.) over crates of fresh vegetables as they move on conveyor. Unit handles ¾-1 carload hourly.

# QUICK COOLING
# Cuts Fresh Vegetable Losses

Southern packer employs special hydro units to speed removal of heat from celery and corn, then guards their quality with fast handling and adequate refrigeration

**C. E. WRIGHT**
FE Correspondent, Jacksonville, Fla

Two hydro-cooling units in use at the fresh vegetable packing plant of Chase & Co. at Sanford, Fla., bring packed products to near freezing temperature in ½ hr. and consequently have reduced spoilage of products to a minimum.

The larger unit, used exclusively for celery, precools an average of 2 carloads an hour. The smaller one, used for corn on the cob, escarole, and other vegetables, will turn out from 2-1 carload hourly, depending on the commodity and the weather. In the 1950-51 season of about seven months, the plant shipped 660,000 packed crates.

From cutting in the field to packing in a car takes an average of 2 hr. for celery, and 1 hr. for corn on the cob. Complete handling of the more distant crops may take a little longer, however.

Celery is brought to the plant in field boxes and immediately dumped into a tank of water, which serves the dual purpose of acting as a cushion to prevent bruising, and of washing off surface dirt.

By chain conveyor, the celery moves past inspectors, who clip off unsightly or damaged branches. Then it goes into a washer, remaining here for 10 sec., with rapidity of action being obtained by recirculation of water at 1,200 gpm. A paddle-wheel arrangement dips the water and throws it over the tops of the product. Pure, but untreated, water is used for this operation.

Leaving the washer, the stalks pass under a spray of fresh water for final cleaning, then are conveyed to packing. Here, they are selected for size and packed into No. 3601 crates, which measure 9¾ x 16 x 20⅜ in.

Packers, standing on both sides of the conveyor, select bunches according to size, the first crew taking off the largest, the second crew the next largest, and so on, so that the celery is finally packed in four sizes—2½ doz.; 3 doz.; 4 doz., and 6 doz. to the crate.

No celery goes to waste. In line with the old meat-packing wheeze about "even the squeal being utilized," Chase gets a return from every portion of the stalk. Strippings are carried along to a point beyond the packers, where the leafy portions are cut off, then the stalks are conveyed to a dicing machine which cuts them into small pieces for shipment to a manufacturer of canned chop suey and chow mein. Remaining leaves are used for cattle feed.

## Quickly Precooled

After the packed cases are closed, they are moved to the precooler which occupies a room 24 x 68 ft. They are then submerged in water ranging in temperature from 32-35 deg. F., but generally 33-33½ deg.

## Packing and Shipping Operations

**WASHED** celery is removed from conveyor and packed in No. 3601 cases.

**CRATES** are closed and wired as they move from packers to coolers.

This cooler was originally built by York Mfg. Co., York, Pa., but has since been added to and modified by company engineers. It consists of a deep tank filled with water which is cooled by flowing over horizontal Baudelot coils flooded with ammonia from an accumulator. In this unit, 2,200 gpm. of water are circulated. The water is chlorinated to keep down bacterial growth. The unit holds 350 cases of celery.

The smaller unit is housed in a room 16 x 75 ft. It employs a water spray to cool the cases of corn and escarole (see accompanying photo). In it, water is circulated at a rate of 2,000 gpm. Company officials say that this unit is more economical to operate, but harder to clean, than the celery unit.

There is no noticeable difference in cooling time between the two units. This has convinced officials that satisfactory results in hydro-cooling units are due to the soaking in refrigerated water rather than how much water circulates.

After precooling, the crates of vegetables are moved directly to cars or trucks. But if there is any delay before loading, the produce goes into one of the two 37½-x-75-ft. cold storage rooms, each with a capacity of about 12 carloads.

These storage rooms are unique in that the only insulation used in their construction was expanded mica incorporated in the 8-in. concrete walls. A deep layer of cinders was laid under the floor. Roof is 8 in. thick.

### Corn Needs Special Handling

It has been found that corn has to be handled much more rapidly than any of the other products. Its quality can deteriorate even in the short time that elapses between the cooling process and the loading into cars or trucks. Hence loading is done by hand to avoid any delay.

By ample icing in cars and trucks, shipments arrive at destination in good condition without additional servicing, unless there is some unusual delay in movement.

Chase is the only celery packing house in this section of Florida that manufactures its own ice and electricity. During the packing season (December to June), it uses about 100 tons of ice daily, half of which is made in the plant and the remainder purchased. Four Fairbanks-Morse diesel engines, with a total capacity of 980 hp., produce power for ice making and other plant uses.

A crushing blower, which discharges 1,800 lb. of ice per minute, is used to ice cars and trucks. Compressors and condensers employed in the hydro-cooling rooms were purchased, but the coils were made to company specifications.

### Use Radio, Also "Eyes"

Time being of the essence in the packing, cooling, and loading of the products, the company has added other speed-up facilities. One of the latest is a two-way radio system connecting its main office and plant with field offices, cars, and trucks, so that any development which would affect the steady flow of produce is immediately communicated.

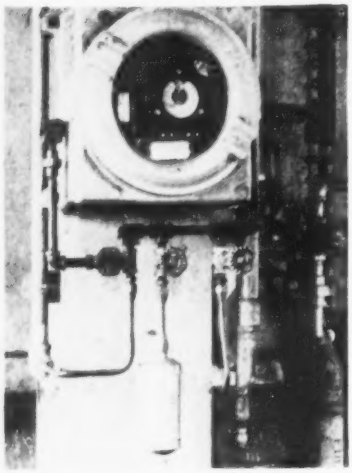
Also, a photo-electric device counts the crates as they pass through the processing operation. And another such unit, on the loading platform, prevents crates from coming closer together than 3 ft. on the loading conveyor.

**CHILLED** vegetables are conveyed from coolers to refrigerated cars.

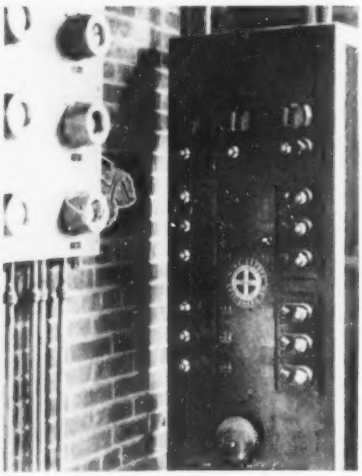
**When Flammable Gas Accumulates**

# Detectors *End*

Fixed units in oil-extraction plant's danger areas, supplemented by portable spotcheck devices, are constant watchdogs against fires and explosions



Instrument in area . . .



. . . flashes signal on panel

Portables patrol, too

**FE STAFF**

Despite the use of large quantities of the flammable solvent hexane in its Champaign, Ill., soybean extraction plant, Swift & Company has been able to maintain ever-safe working conditions by astute use of policing instruments.

To brief the problem, oil extraction with a solvent is a process that requires dependable modern machinery under constant surveillance by alert personnel. Accordingly, a major "must" is use of safety devices, including instruments which instantly detect the presence of dilute combustible vapor mixtures long before a dangerous concentration is reached.

Discussed here are (1) the type of instrumentation used to detect presence of flammable vapors in ample time to prevent a combustible mixture from collecting, (2) selection of locations for installing the instruments in the plant, and (3) how they are employed for maximum safety.

Made by Mine Safety Appliance Co., Pittsburgh, the detecting instrument employed is the combustible gas alarm. It constantly analyzes the atmosphere at locations predetermined by Swift engineers as the points where flammable vapor might collect. Since in itself it is explosion-proof, this instrument is safe to operate in hazardous locations.

### How Detector Functions

Device operates by continuously drawing a sample from the surrounding atmosphere and passing it over the first of two heated, sensitized, platinum filaments that form a balanced electrical circuit. The second filament, a compensator, is sealed in a cell containing uncontaminated air. To provide the utmost sensitivity and precision in the measurement of combustibles, the filaments are constructed to extremely close tolerances.

If a combustible is present in the sample it burns upon contact with the detector filament. Thereby, the platinum wire's temperature is raised, and consequently its electrical resistance. This increase in resistance of the filament upsets the balance in the electrical circuit in direct proportion to the concentration of the combustible in the sample.

Degree of unbalance is measured by an indicating contacting meter, or relay, so designed that when the pointer is deflected to a specific degree well below the lower explosive limit, a circuit is closed. This energizes an alarm system which, with red light and siren scream, announces presence of combustible gas near the alarm.

While every effort is made to confine and control the solvent used to extract the oil, Swift takes no chances. Twelve alarm systems are permanently located in the extraction plant, one at every spot where there is any likelihood that a combustible mixture might form (see drawing).

Also, several additional and supplementary functions are served in the plant by special portable detecting instruments.

Before considering the need for a permanent control at each of the twelve locations, let's review the process:

### Extraction Procedure

During preliminary operations in the 300-ton-per-day capacity plant, soybeans are cleaned, dried, cracked, then heated and flaked. In this latter form, the product is fed in at the top of a vapor-tight 62 ft.-high extractor. Discharge is into perforated steel baskets mounted on a continuous vertical chain conveyor. In these baskets, flakes descend through sprays of soya oil dissolved in hexane. Called "half miscella", this solution, after flushing oil from the flakes, drops to a pump at the bottom of the tower as "full miscella".

After partial extraction on the descent side, flakes are then carried back to the top, being sprayed during this ascent with pure solvent. Extraction of the remaining oil forms "half miscella" which is returned for recycling by a pump at the bottom of the ascent side of the extractor.

Spent flakes, with 40 percent solvent content, are discharged through a closed system to agitated, steam-

# Flame Hazards

jacketed evaporators. Here, solvent is removed and condensed for re-use. Solvent-free flakes are then moistened, toasted, cooled, and ground into meal.

After filtering, "full miscella" is pumped to a steam jacketed evaporator for separation and recovery of solvent. Hexane-free oil is then cooled and pumped to storage.

### All Danger Areas Policed

Alarm stations Nos. 1-6 are located on the first floor of the extraction buildings—at the miscella pumps at the opposite side of the tower, at vapor scrubber outlet, under the water separator, near the water evaporator, and under the solvent work tank.

Stationed on the second floor of the extraction building, instrument No. 7 samples air from the oil cooling tank. Thus placed, this detector serves a dual function—maintaining safety and control of product as well. It assures solvent-free oil and explosion-proof atmosphere. Should the detector's alarm be sounded, contents of tank is reprocessed.

Condenser vapors pass through carbon absorbers for hexane removal before venting to the atmosphere. Alarm No. 8, on the fifth floor, samples discharge from the absorbers, sounding a warning well in advance of absorber saturation, so that a stand-by can be cut in and the discontinued absorber regenerated.

Alarm No. 9, also on the fifth floor, is placed near the pre-evaporators. And No. 10 is on the bridge which carries conveyors between the preparation and extraction building. Air in the raw flake conveyor is sampled by this instrument to give warning should any vapor escape from the extractor back into the raw flake line.

Alarm No. 11, on the extraction building end of the spent flake conveyor, warns if hexane vapor remains in the flakes. No. 12 samples air at floor level to detect any escaped gas under the miscella filters.

### Instrument Checks Instruments

Additional protection is obtained by periodic tests throughout the entire system, using portable indicators that quickly and accurately sample air mixtures at any location. These self-contained units are extremely sensitive but nevertheless simple to operate. Samples are drawn through the indicator by means of a bulb aspirator. A direct-reading meter shows at once, for the sample, the percent reading of the low limit explosive level. As an example, if a concentration of 40 percent hexane constituted the minimum amount of the gas which would form a combustible mixture, an instrument reading of 25 would indicate that 10 percent of the sample was hexane, or one-fourth of the gas necessary to be explodable.

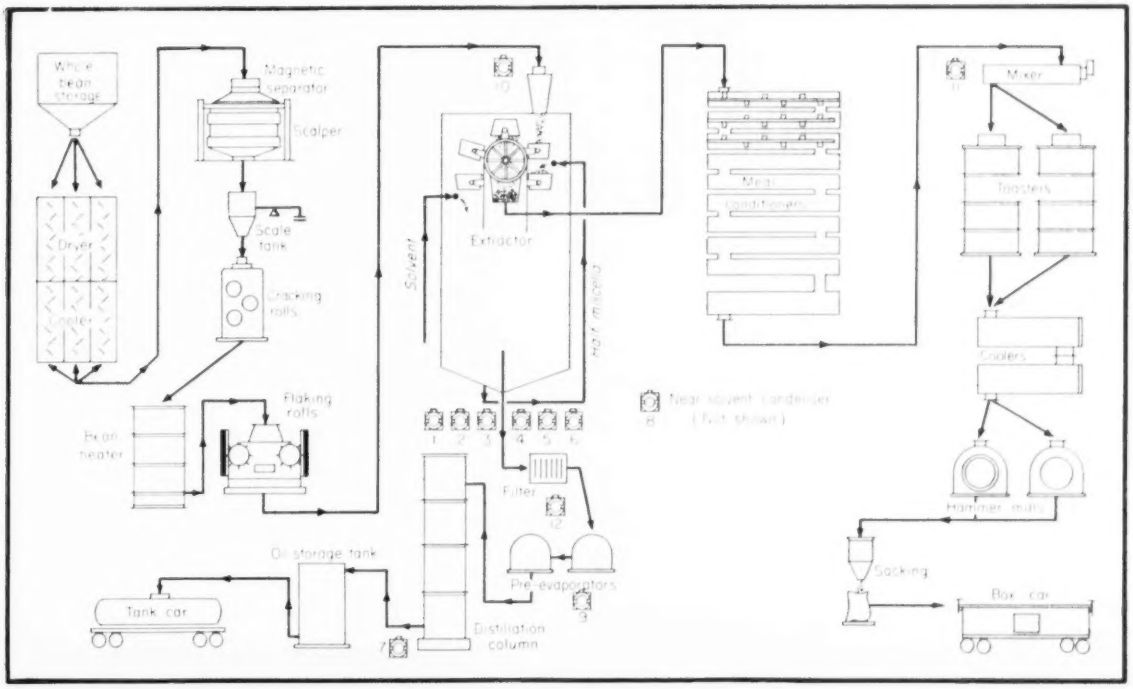
Using these portables, spotchecks are made at 13 locations in preparation and extraction buildings six times daily, with results filed on log sheets. These spot readings serve as additional checks on conditions in the plant, and also on the permanently located instruments. In addition, the constant checking and logging of data yields quantitative information of value in keeping plant operations at top efficiency.

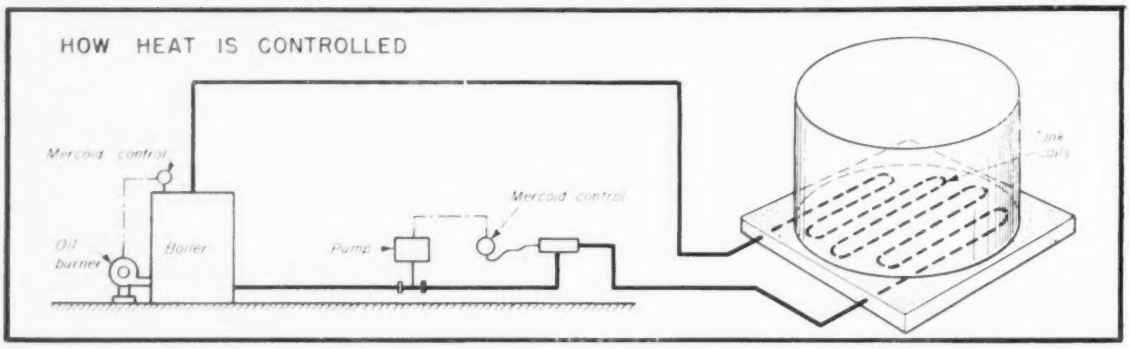
Portable detector-checks also precede all repair and maintenance, thus determining when these operations can be conducted safely.

One other overall safety measure is also taken: An inspection of all safety equipment is conducted monthly to insure that every device functions perfectly. Checking of detectors, done with a known mixture of inflammable and air is conducted by a four-man committee, which submits a written report on each item inspected.

Since early 1949, when this plant started operations, there has been no mish-up due to fires or explosions.

## 12 Against Trouble: Plan shows unit locations






**LAYOUT** shows components. Controls on boiler water and return water lines regulate system's heat-transfer.

# *Conditions* Product for Pumping

Yonkers refiner installs huge hot-water coil system in concrete slab beneath outside liquid-sugar tank to control material's viscosity for handling

**WILLIAM J. MATHEWS**
Chief Engineer, Refined Syrups & Sugars, Inc., Yonkers, N. Y.

How to warm liquid sugar in an outside storage tank—without local overheating and consequent caramelization—posed a problem at our plant, Refined Syrups & Sugars, Inc., of Yonkers, N. Y. Direct object, of course, was to decrease viscosity and thus facilitate pumping.

After weighing the possibilities, we finally turned to indirect tank heating as the answer—and were pleased to find the method both practical and economical.

The installation developed is, as far as this writer knows, the first where indirect heating has been used to simplify the handling of liquid sugar. Of course, since no data on heat loss to atmosphere for liquid sugar stored in outdoor steel tanks was available, a fundamental study was essential.

Subsequently, a design was prepared and the heating system—oil-fired hot water boiler and wrought iron coils—made and installed. But first a word on the preliminaries:

## Initial Observations

Temperature changes in liquid sugar stored in a medium size outdoor tank were observed and tabulated (see Table). Diameter of the cone-bottom tank was 16 ft. with height on the straight section 32 ft. 9 in.; and on the bottom cone section 1 ft. 8 in. The tank had a steel plate roof, and it was painted aluminum on the outside and had a resin base surfacer on the inside.

From the data collected covering tank surface area in contact with the liquid and the atmosphere, the amount of heat loss to atmosphere was found to be approximately 1 Btu. per sq. ft. per deg. F. temperature difference per hr.

A liquid sugar temperature of 55 to 60 deg. F. was found to facilitate adequate flow to and from the pumps in this location.

Taking, as an extreme condition, a liquid sugar temperature of 65 deg. F. and an outside air temperature of 5 deg. F., the possible heat loss to the atmosphere from a tank measuring 38 ft. dia. by 38 ft. high is calculated as follows:

1.0 x 5,568 sq. ft. x (65 — 5) equals 342,000 Btu. per hr. required, neglecting heat losses through the foundation to the ground, and other losses.

## System Details

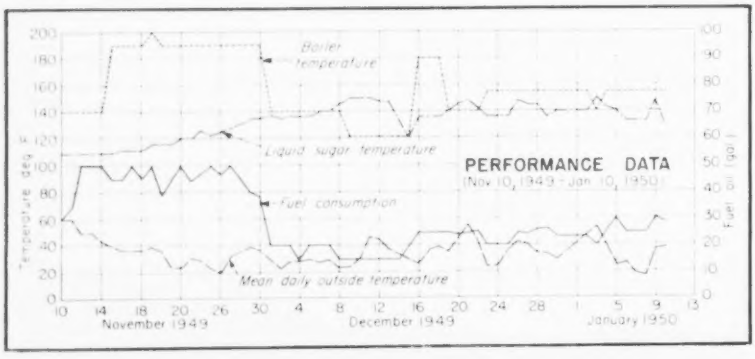
The installation was made under a new steel tank, dia. 38 ft., height 38 ft., capacity 320,000 gal., and painted as described above. The tank was isolated from our heating source—an oil fired hot water boiler. The heating element was comprised of 2 in. dia. wrought iron coils set in a concrete

(Turn to page 144)

## Preceding Figures, New Working Performance

**TABLE—DATA ON VARIABLES** Gathered in Preliminary Study

| Date | Time | Gal. in Tank | Temperatures (Deg. F.) Atmosphere | Liquid at Center |
|---|---|---|---|---|
| 3/17/49 | 3:30 P.M. | 9546 | 44 | 55 |
| 3/18/49 | 9:00 P.M. | 9420 | 36 | 51 |
| 3/19/49 | ..... | 9420 | ... | ... |
| 3/20/49 | 2:00 P.M. | 9420 | 33 | 47 |



# NEW EQUIPMENT & SUPPLIES

## Auto-Filler for Paper Milk Containers

Of interest to all size dairies is a recently developed automatic milk filler for use with paper containers.

New machine is compact and fills milk into the popular American Can type paper carton.

While machine is especially suited for small and medium size dairies, larger plants have also expressed approval in it for short run production—where it does not pay to use and change over large filling equipment. Changeover time with this unit is reported to be less than five minutes.

Known as the Model R-4 Filler, it opens, fills, code dates and closes—quarts, pints and half-pints at speeds of 20 containers per minute. Unit utilizes a 4-station filling feature—with each station filling ½ pint—thereby enabling it to obtain relatively high production without foaming.

Accuracy of filling is guaranteed. This is made possible through a newly patented rotary piston operation stated to pre-measure quantities to the exact ounce. In addition, automatic controls are provided to prevent waste and spillage of milk in event an empty carton is not beneath the filling nozzle—or in event carton has not been completely opened.

Other features include a system that eliminates foaming problems, if and when they occur. This system consists of a dry steam application between the third and fourth filling stations, and an additional blast of steam to clean the carton top just before closing.

Machine boasts many sanitation qualities, and quick disassembly for easy cleaning, without tools. Filler is equipped with an automatic dater, an automatic hopper float valve, and a convenient hopper drain. Variable speed drive permits speed range of 8 to 24 cartons per minute—*Bagby Div., Triangle Package Machinery Co., 6635 W. Diversey Ave., Chicago 35.*

Circle 99A on Reader Service Card

## Copper-Clad Steel Plate Has Many Applications

Commercial production of copper-clad steel plate, latest engineering material combining special properties of copper and steel, has been announced.

Clad metal is expected to meet long felt want for many electrical, heat transfer, and corrosion applications requiring copper's high conductivity and corrosion resistance combined with steel's low cost, strength and rigidity. Applications will include electrical apparatus, evaporators, hot water heaters, heat exchangers, tube sheets, tanks and vessels.

Combining unique chemical and physical characteristics with good fabrication properties, copper-clad steels simplify problems of equipment and fabrication in many types of applications. Fabrication time can be cut considerably, reducing production costs. For many types of equipment a smaller thickness of copper-clad steel can serve the same purpose as a thicker section of solid copper, reducing material costs and saving space and weight.

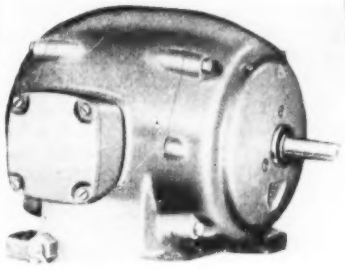
Available in plate gages only, it consists of a layer of copper permanently and uniformly bonded to one side of a carbon-steel backing plate. Cladding percentages of 10, 15 or 20 percent of total plate thickness will be regularly furnished in plate sizes up to 120 in. width, 380 in. length and $\frac{3}{16}$ to 1¼ in. thickness. Copper-clad steels are also available in flanged only or flanged and dished heads.

Homogeneous and dense in structure, copper is unchanged in any way by being bonded to steel. Characteristic corrosion resistance and electrical conductivity are assured. Two types of cladding are regularly furnished: Oxygen-free high conductivity copper for special electrical applications, and phosphorous deoxidized copper for improved weldability.

Mechanical properties of copper-clad steel are governed by the type of backing steel used.—*Lukens Steel Co., Coatesville, Pa.*

Circle 99B on Reader Service Card

## Totally-Enclosed Motor Is Self-Cooling Unit



This new totally-enclosed motor has been developed for services where dampness, dust, fire hazards and corrosive fumes are prevalent.

Designated Type SS, it is self-cooling. Its construction eliminates use of an exterior fan. Smooth exterior lends itself to wiping off or hosing down—an important feature in dusty and dirty locations. Motor also provided with slinger to protect output shaft bearing against entrance of dirt

or water has been approved for explosion-proof service in hazardous locations by Underwriters' Laboratories, Inc.

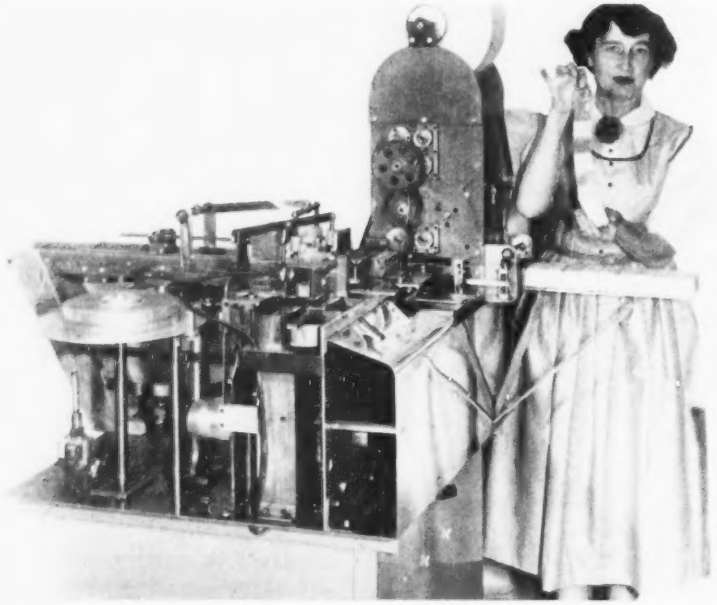
Under certain conditions, condensation, caused by "breathing" sometimes occurs in totally-enclosed motors. This can cause grounding of motor. To overcome this problem maker has available an Underwriters'-approved drain plug which will release water from motor interior while still retaining its explosion-proof characteristics.

Motors are available in a range from ¼ to 2 hp.

Additional features claimed are: Modern exterior design; sealed terminal chamber; normalized castings; asbestos-protected windings; solid centricast rotor and; Lubriflush bearings which are stated to provide an extra large lubricant chamber and provision for forcing grease through bearing for a thorough purge of old grease.—*U. S. Electrical Motors Inc., Box 2058, Terminal Annex, Los Angeles 54.*

Circle 99C on Reader Service Card

## Machine Cuts, Wraps Individual Butter Patties



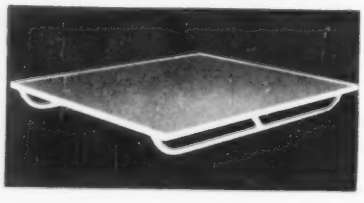
Packages, ¼, ½, and 1 lb. in size, comprised of individually, cellophane-wrapped patties are produced from a slab of butter by this automatic machine. It can process 1,000 lb. of butter per hour.

In operation, machine feeds slab automatically into channel tracks at far left. It then cuts slab into individual pattie size, separates the patties, and wraps them in a continuous ribbon of cellophane fed from roll at left. Machine then restacks patties in ¼-lb. packages from roll of butter paper at machine top.

A simple dispenser has also been developed for restaurant use which unwraps and drops patties to individual plate.—*Codic-Kay Co., Inc., 1139 San Julian St., Los Angeles 15.*

Circle 100A on Reader Service Card

## Tubular Steel Pallet Is Easy to Handle



Compact stacking and easy handling is claimed for this all-purpose, heavy-duty tubular steel pallet. It is reported to weigh less than a wood pallet of same deck dimensions and load potential.

Newcomer in materials handling field is an eight-entry pallet. Two or more tubular skid runners are welded and braced to a rectangular angle-iron frame which encases and protects a tough laminated wood deck.

Sled-like construction permits easy movement over uneven surfaces and obstructions. Pallet is termed adaptable for storage racks (of any design), in conveyor systems, and all phases of production and transportation.

Pallet affords no chance of injury from splinters or projecting fastening devices.

Experience of present users indicates greatly extended serviceable pallet life. Further, they are stated able to sustain greater shocks and centered loads without damage.

Production will not be confined to "standard" sizes of types. Maker will produce pallets to meet each customer's specific requirements as to size and capacity.—*Econoweld Co., 1805 Webster St., Dayton, Ohio.*

Circle 100B on Reader Service Card

## Incline Belt Simplifies Transfers Between Floors

Movement of packages from upper to lower floor is expedited with use of "Streamliner" 30 deg. inclined belt conveyor.

Extra long tail section permits hand loading or unloading from sides. Unit can be furnished to operate up or down at constant speed of 45 fpm. Rollers can be set high for oversize packages, or set low to provide protective guard rail on both sides of belt.

Modified designs of this unit are offered in standard sizes up to 30-in. belt width, with 5½-in. side channels, with or without guard rails. Portable units can also be furnished.—*Harry J. Ferguson Co., West Ave., Jenkintown, Pa.*

Circle 100C on Reader Service Card

## Transmitter for Automatic Control System

Announced is new differential-pressure, primary-element transmitter for use at point desired in automatic control systems.

Known as Type D2T, unit is used in conjunction with maker's autronic control system and covers differential pressure range of 0-20 in. to 0-200 in. water at static pressures up to 1,500 psig. Installed at point of measurement, unit transmits electric signal which is directly proportional to variable being measured.

Transmitter has a corrosion-resistant stainless steel diaphragm. Minute movements of diaphragm are transmitted through friction-free amplifying linkage to movable core of the differential transformer which provides the 0.0 to 0.500v, 60 cycle a.c. signal output required for operation of other units in the control system.

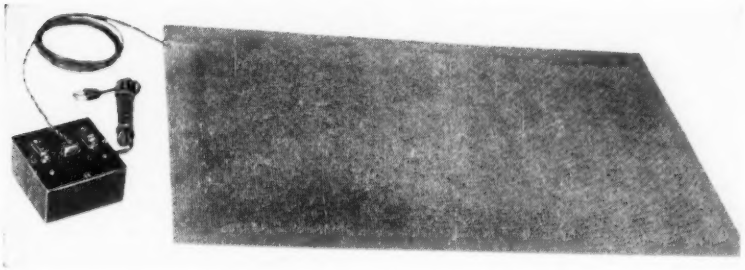
A feature of unit is anti-thrust pressure seal which transmits motion of sensing diaphragm to signal-generating differential transformer, and acts as seal against high static pressures.

Unit incorporates spring for zero adjustment, a linkage ratio adjustment for coarse span, and an electrical adjustment for fine span which does not affect zero adjustment.

Unit is compact, measuring 13 in. long, 6½ in. high, and 5¾ in. deep. Net weight is 26 lb.—*The Swartwout Co.*, 18511 *Euclid Ave.*, *Cleveland* 12.

Circle 101A on Reader Service Card

## Pressure Switch Mat Actuates Equipment



Electrically operated equipment—machine doors, alarms, bells—can now be actuated from any point over an extended area with a switch mat.

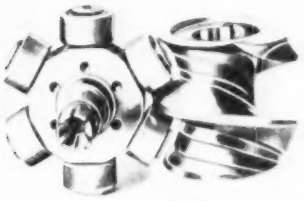
Constructed of durable vinyl plastics and/or rubber, they are available in any size or shape from 2 x 2 in. to 36 x 144 in. These switches are actuated by pre-determined pressures ranging from a few ounces to several tons. Only $\frac{3}{16}$ in. thick, they can be used on floors, platforms, stair treads, without obstructing foot or vehicle traffic. Foot pressure on any part of area covered by mat closes the circuit; release of pressure instantly opens it.

Mats are hermetically sealed against moisture and weather between vinyl, rubber or Neoprene. They can handle up to 1 amp. at 110v, directly, and can control operation of high voltage, high current devices when used in conjunction with control boxes.

Available controls cover types for temporary and permanent installation, and provide instantaneous and delayed action. Typical uses are as versatile foot switches for various industrial and commercial electrical equipment; actuators for automatic door operators; interplant traffic controls; and safety and production devices for machine operators.—*The Recora Co.*, 7419 S. *Western Ave.*, *Chicago* 36.

Circle 101B on Reader Service Card

## Gear Drive Provides Intermittent Motion



High speed, precise intermittent motion is reported permissable with this new type roller gear drive. Design versatility and low maintenance are also claimed for new unit.

Maker states tests have demonstrated that drive will operate 8,000 hr., when extreme precision is required, without maintenance. When precision is not extreme, unit operates up to 20,000 hr. Even after such long use, unit can be renewed merely by replacement of standard ball bearings.

To take care of either new or existing machinery, drives are custom-designed with any number of stops from two up. Indexing period, an entirely separate consideration, may vary from 25 to 100 percent of total cycle time—either right or left hand rotation is obtainable.—*Roller Gear Div.*, *Ferguson Machine & Tool Co.*, *Inc.*, 471 *Paul Ave.*, *Ferguson* 21, *Mo.*

Circle 101C on Reader Service Card

### Want More Information?

**It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.**

**For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.**

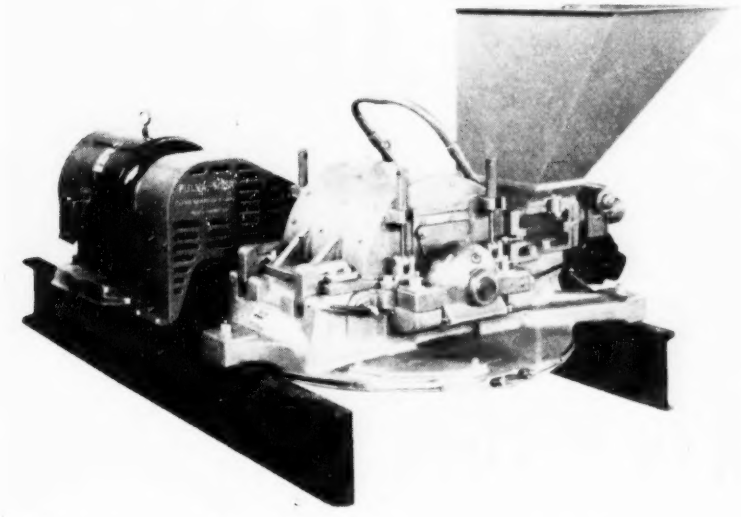
*Seasons Greetings*

# SCANDIA

*Manufacturers of Better Packaging Machinery*

• SCANDIA MANUFACTURING CO. • 500 BELLEVILLE TURNPIKE • NORTH ARLINGTON, N. J. •

## Pulverizing Mill Handles Variety of Feed Sizes



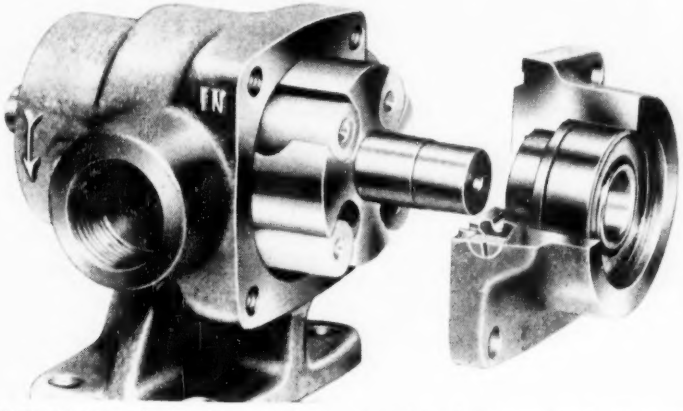
Twin feed screws, 1¾ to 4 in. in dia. to handle wide variety of feed sizes and types, are improvements reported for new Models C and D pulverizing mills.

These units are precision built, impact mills of the swing hammer type employing high speeds and close clearances for ultra fine grinding. Through the use of knife-type hammers and low speeds with controlled clearances, they are reported ideal for granulating.

Drop forged hammers of the stirrup type are built up on the wearing edge with various types of hard surfacing alloys. New models have quick opening hinged covers for complete access to grinding chamber for inspection or cleaning. In designing these machines, emphasis was placed on ease of handling and servicing.—*Pulva Corp., 549 High St., Perth Amboy, N. J.*

Circle 103A on Reader Service Card

## Scoop-Rotor Pump Handles Powder Solutions



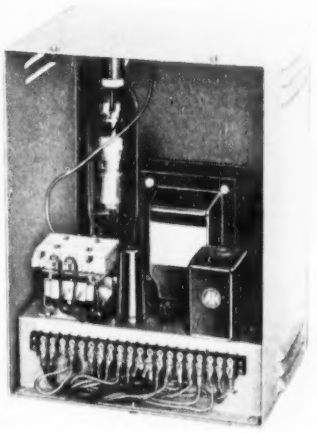
High efficiency in handling erosive, wettable powder solutions is claimed for new industrial pump designed with scoop rotor and roller-type vanes.

Called Hypro 4000 Series, unit is stated to withstand continuous heavy radial loads through use of sealed lubricated ball bearings. Additional feature is pressed fit of stainless steel shaft into inner race of ball bearings to restrict lateral movement of rotor, minimizing end thrust and wear of rotor within pump. Performance tests indicate friction losses are held to a minimum when pumping at higher pressures.

Pump is available in cast iron or Ni-Resist. It features Nylon or Hy-Car rubber rollers, self lubricated by water and highly abrasive resistant. It is self priming and will deliver approximately 7½ gpm. at 100 psi. and 1750 rpm. Pump is furnished with ¾ in. ports. Weight is 4½ lb. net.—*Hypro Engineering, Inc., 404 No. Washington Ave., Minneapolis 1.*

Circle 103B on Reader Service Card

## Electronic Unit Controls Fractional HP Motors



Immediate availability of a new development in motor control equipment, the Electronic variable speed drive for fractional horsepower motors is announced.

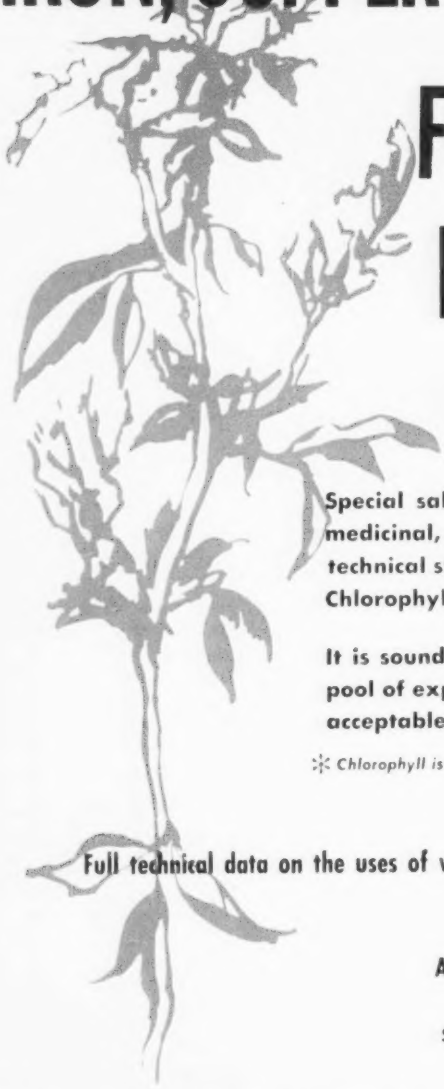
Packaged drive consisting of an electronic, adjustable speed control unit driving a series motor. Unit provides wide, stepless range of speed control with good regulation under varying loads. With optional dual range feature, speeds from 100 to 3,500 rpm. are available. Motor can be started, stopped or dynamically braked and can be rapidly accelerated to preset speeds.

Drive is termed unique in using a series motor instead of shunt motor. Series motor makes use of both a.c. and d.c. current output from a single Thyratron tube, and it is claimed that this results in much higher speeds at medium torque, much higher starting torque at slow speeds, longer tube life and therefore lower tube replacement costs.

As pilot device, push-pull selector switch will be used. Maker states this will give added versatility and convenience through single point control and will conserve space. Conventional push buttons will be furnished if desired.—*Motor Control Div., The Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn.*

Circle 103C on Reader Service Card

# CHLOROPHYLL*
## AND
# CHLOROPHYLLIN
## IRON, COPPER or MAGNESIUM SALTS



## FOR FAST DELIVERY!
## IN ANY QUANTITY!!
## IN ALL GRADES!!!

**Special salts and grades of chlorophyll developed for individual food, medicinal, confectionery, cosmetic and industrial uses by our experienced technical staff. Technical Sales Advisors: Lake Worth, Florida, or American Chlorophyll Sales, 745 Fifth Avenue, New York 19, N. Y.**

**It is sound procedure to buy from the oldest concern with the greatest pool of experience . . . sound procedure which makes for a standardized, acceptable product.**

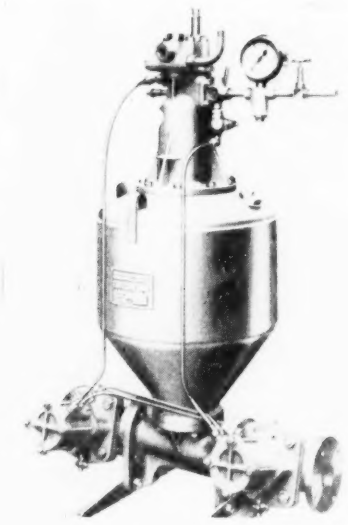
* *Chlorophyll is Oil Soluble, Chlorophyllin is Water Soluble*

**Full technical data on the uses of various grades, and price information furnished promptly on request.**

**AMERICAN CHLOROPHYLL DIVISION**
**Strong Cobb & Co. Inc.**

**Lake Worth, Florida**

## Air-Operated Pump For Liquid Foods



Hot soup, fruit pulps, and syrups can be moved by this new, compressed air-operated displacement pump. Unit is reported purely pneumatic in action having no rotating or reciprocating parts.

Called the "Ejectopump", it operates automatically when connected to compressed air supply line and pumps liquids to be handled in series of regular suction and discharge strokes. Self-priming, pump can be arranged above level of liquid handled.

Pump has no bearings, glands or revolving shafts.

Unit consists of cylindrical casing, float and two return valves, all of which are in contact with the liquid. A header mounted above the casing is never in contact with the pumped liquid. Header houses pneumatic valves and air-operated ejector which is in operation during suction stroke only. Rate of air admission to casing during delivery stroke is adjustable, and output can be controlled to give any desired pumping rate.

Pump requires no lubrication. Casing is never completely emptied during normal working and no air passes into delivery pipe. Thus, aeration is eliminated and no churning action makes pump particularly suitable for food products. Further, since there is no vibration, special foundations are not required, and pump can be placed on any level surface.

Pump when supplied with compressed air at 30 to 50 psi. will deal with discharge heads up to 50 ft. Normal maximum suction is 10 ft., but by fitting a special ejector, 20 ft. can be dealt with.

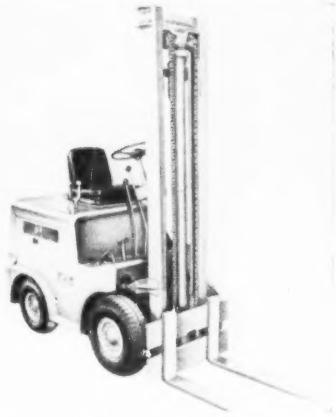
Standard pump has a mild steel casing with gunmetal or cast iron non-return valves, gunmetal float and float rod and cast iron header with gunmetal fittings. They are supplied in Monel, Inconel or stainless steel.

Units are available in 1½, 2, 3, 4 and 6 in. sizes.

Pumps are manufactured by Gresham & Craven Ltd., Great Britain and can be obtained from—*Ferro Corp., 4150 E. 56th St., Cleveland 5.*

Circle 105A on Reader Service Card

## Fork-Lift Truck Operates In Very Narrow Aisles



Designed for use in narrow aisles and other restricted space areas is this new Yardlift "20", pneumatic-tired fork-lift truck of 2,000 lb. capacity.

Tilt action and upright stability are improved by twin double-acting tilt cylinders, which replace single cylinder formerly used.

Honed cylinder surfaces assure positive seal and long packing life. Piston-type construction minimizes leakage and maintenance. Rods are effectively protected from dirt by rubber dust boots.

Convenient instrument panel on new model is positioned for easy reach and best visibility. It includes all recording dials, ignition switch and starter button.

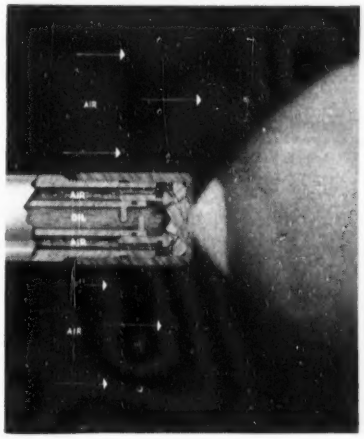
New quick-change clutch is another improvement in this model.

Elliott-type steering axle is employed. Axle is pivoted in rubber torsional bearings to minimize road shock and at truck frame center to permit constant wheel contact during travel over uneven surfaces.

Other specifications of new truck are: Length, overall less forks, 72⅜ in.; outside turn radius 71⅜ in.; minimum intersecting aisle 59 in.; width overall 34⅜ in.; wheel base 40 in.; steering wheel height 59¼ in.; under-clearance at center 6 in.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Circle 105B on Reader Service Card

## Burners Add Flexibility In Use of Fuel Oil




Cleaning and maintenance costs are reported minimized on Powermasters, package unit boilers, now being equipped with Voriflow, air-atomizing, burners.

New burner is stated to permit greater flexibility in use of fuel oils. Excellent flame and consistently clean combustion are claimed with use of light through No. 6 Bunker C oils over loads ranging from 30 to 100 percent.

On new burner, beryllium copper body holds stainless steel cap over multiple slots in stainless steel core forming converging flow paths for atomizing air. Only about 1 percent of total full load combustion air is thus admitted with oil for atomization which permits much closer control of combustion air from blower and resultant high efficiency at light loads.

Fuel oil flows through central tube and is picked up at multiple injection points by individual air streams. Dams near end of oil tube prevent dripping after shut down. Beryllium copper body and brass air tube conduct heat back to plenum where it can be quickly dissipated at low temperature. Boilers equipped with new burners are made in 16 sizes from 15 to 500 hp. for pressures to 250 psi.—*Orr & Sembower, Inc., Morgantown Road, Reading, Pa.*

Circle 105C on Reader Service Card

# GET THE FACTS about the WHITE 3000 AND SAVE

Telling-Belle Vernon Company has White Trucks tailored to its exact requirements in wholesale delivery and transport service in many cities.

***MILK PLANTS** everywhere like the time and cost-saving advantages of the White 3000 in milk plant transport service. Maneuverability in heavy traffic and congested areas saves pick-up and delivery time . . . permits more deliveries, longer routes.*

**FIND OUT** what the White 3000 does in *your* business. See what its modern design means to *you* in the way of more deliveries per day . . . in less time . . . at lower cost.

Here is new maneuvering ease . . . new loading and unloading time savings . . . new energy-saving design that makes the driver a better driver and a better salesman.

Its exclusive power-lift cab saves maintenance time and cost. And its White Quality means lower operating cost . . . longer life.

**Get this Scientific Truck Evaluation from your White Representative . . . Today!**

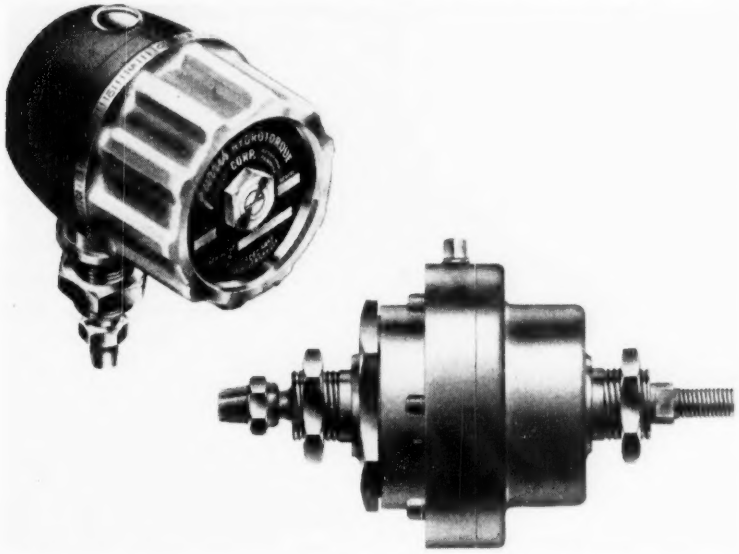
Call your White Representative for a complete evaluation of *your* truck operations. It will tell you the factual story of efficiency and economy tailor-made to your own delivery service. It means money saved . . . delivery costs reduced . . . in your business!

**THE WHITE MOTOR COMPANY**
Cleveland 1, Ohio

White

*FOR MORE THAN 50 YEARS*
*THE GREATEST NAME IN TRUCKS*

## Hydraulic System Provides Accurate Positioning



Accuracy and power are provided with use of new hydraulic positioning control system recently announced.

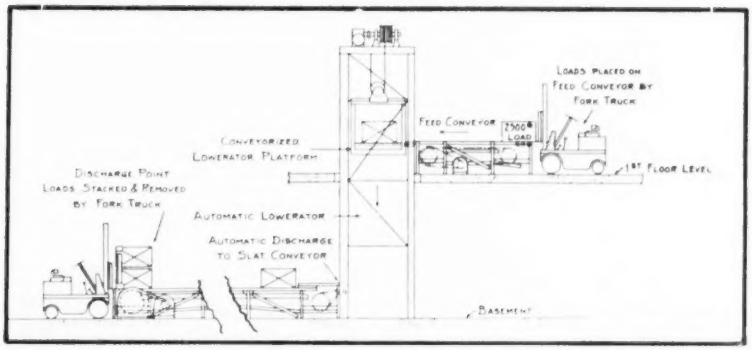
Named Hydrotorque, it will hydraulically position valves, throttles, engine speeds, metering nozzles and a wide variety of other mechanical devices. The control system will indicate level, flow, static pressure, or temperature.

A single tube system, it is independent of outside energy, termed simple to operate and economical in first cost and maintenance. Eliminating "sponginess," the system is stated to give operator the "feel" of direct linkage, with confidence of positioning. Transmitters and receivers can be supplied in wide variety of combinations and in many variations of mounting methods.

Calibration of dials is to custom requirements and can be made to read in in. of water, psi., or gpm.—*Farris Hydrotorque Corp., 516 Commercial Ave., Palisades Park, N. J.*

Circle 107A on Reader Service Card

## System Speeds Inter-Floor Load Movements



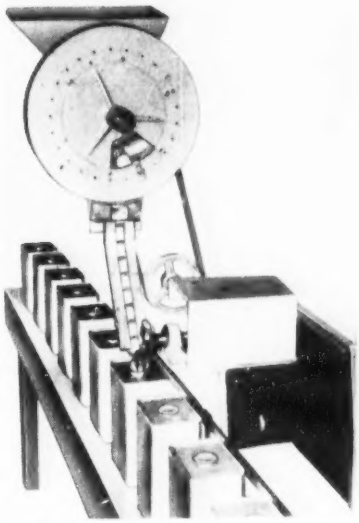

Where large quantities of materials must be transported between floors with relative frequency, employing this automatic lowerator-conveyor system is reported to release elevators and fork trucks for other work, relieve plant traffic conditions, and cut work hours.

System comprises three major units: (1) Lowerator; (2) feeder conveyor; and (3) take-off conveyor. All three units operate automatically and are interlocked and controlled by electric eyes and limit switches. When feeder conveyor receives load it delivers it to lowerator which descends and delivers load to take-off conveyor. From here, it is removed for storage. One element of system will not discharge its load until next is ready to receive it.

Lowerator and conveyors are constructed to fit given space requirements and to handle specific loads. They can operate in either or both directions.—*Gifford-Wood Co., Hudson, N. Y.*

Circle 107B on Reader Service Card

## Automatically Applies Container Lids, Seals



Metal seals, inner seals and friction lids are automatically applied to tin and fiber containers by this recently developed machine.

Unit is reported to employ novel method of applying such seals to any position on top of can via rotating magnetic head timed with continuous movement of can on chain conveyor.

Machine consists of specially designed hopper which automatically feeds lids or seals into chute. A rotating head equipped with magnetic fingers picks up seal from bottom of chute and applies it to opening in can as it moves into position under rotating head. No supplemental operation is necessary as application of seal is stated to be positive and therefore no additional device is required for effective sealing.

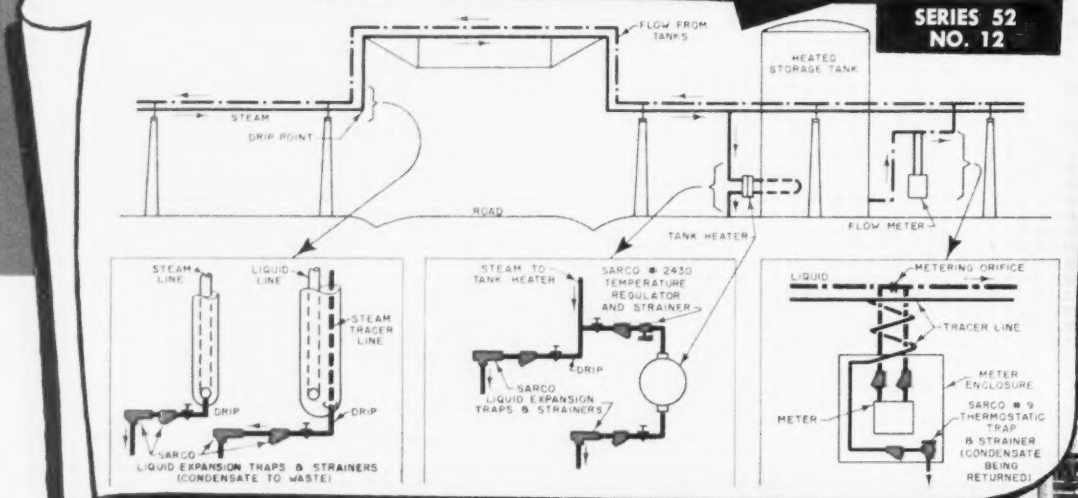
During application of seal, can is in continuous motion, no momentary stopping or holding being required—thus danger of splashing or spilling is eliminated.

Rotating head, as well as magnetic fingers are all fully adjustable, so that seals or lids may be applied to an opening in any position on top of can. These adjustments include compensation for variations in cans.

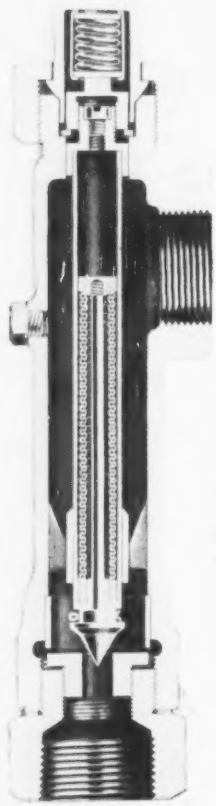
Chute, at bottom, is equipped with an escapement device which permits only one seal at a time to be withdrawn. Devices for marking or coding

# Steam Trapping OUTDOORS

SERIES 52 NO. 12




**Trapping outdoor storage tank heaters, tracer lines and steam mains with Sarco LIQUID EXPANSION thermostatic steam traps.**



**Sarco No. 871 LIQUID EXPANSION thermostatic steam trap for outdoor applications. Discharges condensate in a continuous stream at temperatures always below 212°F.**

Have you the problem of removing air and condensate from outdoor storage tank heaters, tracer lines and mains?

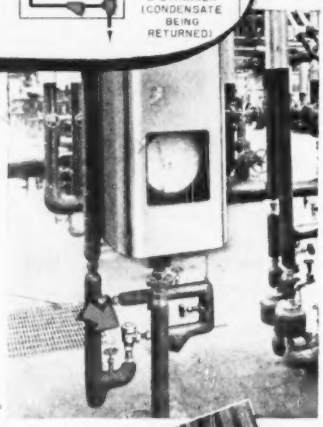
Sarco, and Sarco alone offers you a special LIQUID EXPANSION thermostatic steam trap designed especially for this type of installation.

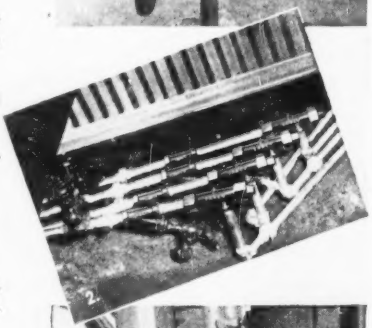
The Sarco LIQUID EXPANSION thermostatic steam trap has these advantages:

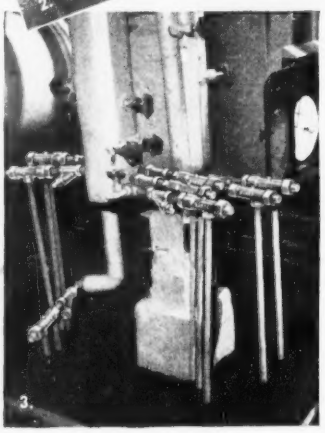
1. Needs no protection against freeze ups.
2. Discharges condensate at adjustable temperatures below 212° F., making it possible to use some of the sensible heat of the condensate.
3. Small size, light weight, large capacity — as easy to install as a pipe elbow.
4. Not affected by water-hammer, vibration, pressure pulsations or superheat.
5. And just as effective indoors too.

*Write for new Bulletin 260-4, free for the asking.*

**SARCO COMPANY, INC.**, Empire State Bldg., New York 1, N.Y.
SARCO CANADA LTD., TORONTO 8, ONT. REPRESENTED IN PRINCIPAL CITIES.







1. Removing air and condensate from coil heaters in flow meter cabinets with Sarco No. 9 balanced pressure thermostatic steam traps.
2. Steam jacketed asphalt lines and a jacketed pump drained by Sarco No. 871 LIQUID EXPANSION steam traps. (Globe Roofing Products Co. Whiting, Ind.)
3. Sarco No. 871 LIQUID EXPANSION Steam Traps draining air and condensate from steam tracing lines.

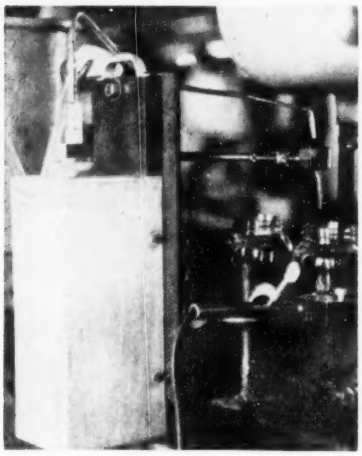
**SARCO saves steam**
improves product quality and output

416

seals while in chute can also be furnished. In those special cases where seals are rolled in under neck of the spout, as on olive oil cans, a special spinning head can be furnished thus providing a compact, double purpose unit on one base.—*Tite-Cap Machine Co., Inc., 76A Rose St., N. Y. C. 38.*

Circle 107C on Reader Service Card

## Compact Device Dispenses Liquid in Exact Volume



Small, precise volumes of liquid can be automatically dispensed into containers on production lines with use of new, compact machine.

Known as the Micro-Portioner, it has few moving parts, employing a solenoid as driving force.

In operation, specially designed switch is placed in line of travel of bottles or cans on conveyor. When container trips switch, a measured amount of liquid is drawn into the unit. When bottle has passed switch, liquid is ejected into bottle which is passing beneath delivery tip. In this way, container gets shot of liquid without ever stopping on conveyor—no bottle, no fill.

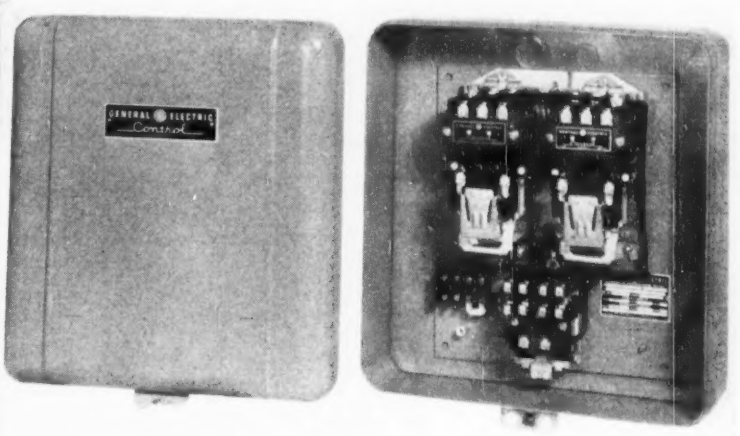
Ejection rate is variable—from dribble to squirt. Cycle is so rapid, that any container with an opening of 1 in. or larger can be handled at speeds up to 150 per min. when delivery is less than 2 ml. Deliveries in excess of 2 ml. are proportionally slower. Amount dispensed is easily adjustable from 0 ml. to 5.0 ml.

Accuracy in the neighborhood of 1 percent is stated routine.

Unit is fully portable and very compact. It weighs 11 lb. and measures 4 x 4 x 15 in. It bolts directly to side of conveyor.—*Kaufman Laboratories, 2833 Westminster Ct., Louisville, Ky.*

Circle 109A on Reader Service Card

## Panel Automatically Cuts-In Emergency Supply




When normal electric power source fails, this new automatic throwover panel transfers circuits to an emergency supply.

Panel consists of mechanically interlocked normal-source and emergency-source contactors plus a pilot contactor. Besides transferring circuits from a failed normal to an emergency source and back again upon resumption of regular service, these contactors also control standby power equipment, such as auxiliary generator, turning it on and off at appropriate times.

Panel features a contactor whose air gap is not affected by condition of striking surface. Air gap is a permanent and unchangeable part built into stationary magnetic structure and, according to maker's engineers, no matter how many or how few operations unit may undergo, both normal-lead and pilot contactors drop out reliably upon power failure.

A special annealing of entire magnet structure further reduces residual magnetism resulting in consistent drop-out voltages and quick transfer of load to emergency source.

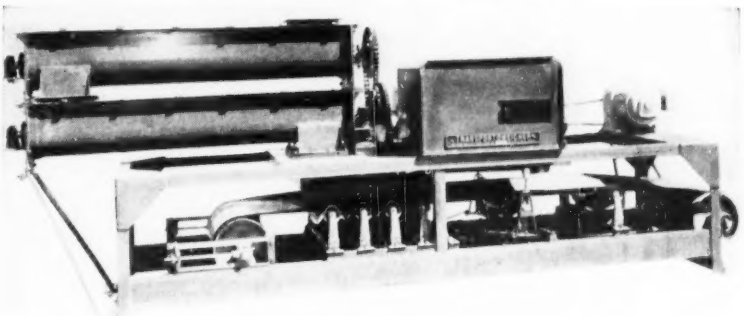
Load contactors feature a coil that is impregnated in a solid block of solventless varnish for maximum protection against moisture and other damage.

For special applications requiring close control of transfer voltage, as on power lines of poor regulation, a voltage-sensitive relay can be provided to transfer the load at a very closely controlled voltage point.

Standard line of automatic throwover panels, sizes 1 to 3, employ vertical-lift contactors, and sizes 4 to 6 use clapper-type.—*General Electric Co., Schenectady 5, N. Y.*

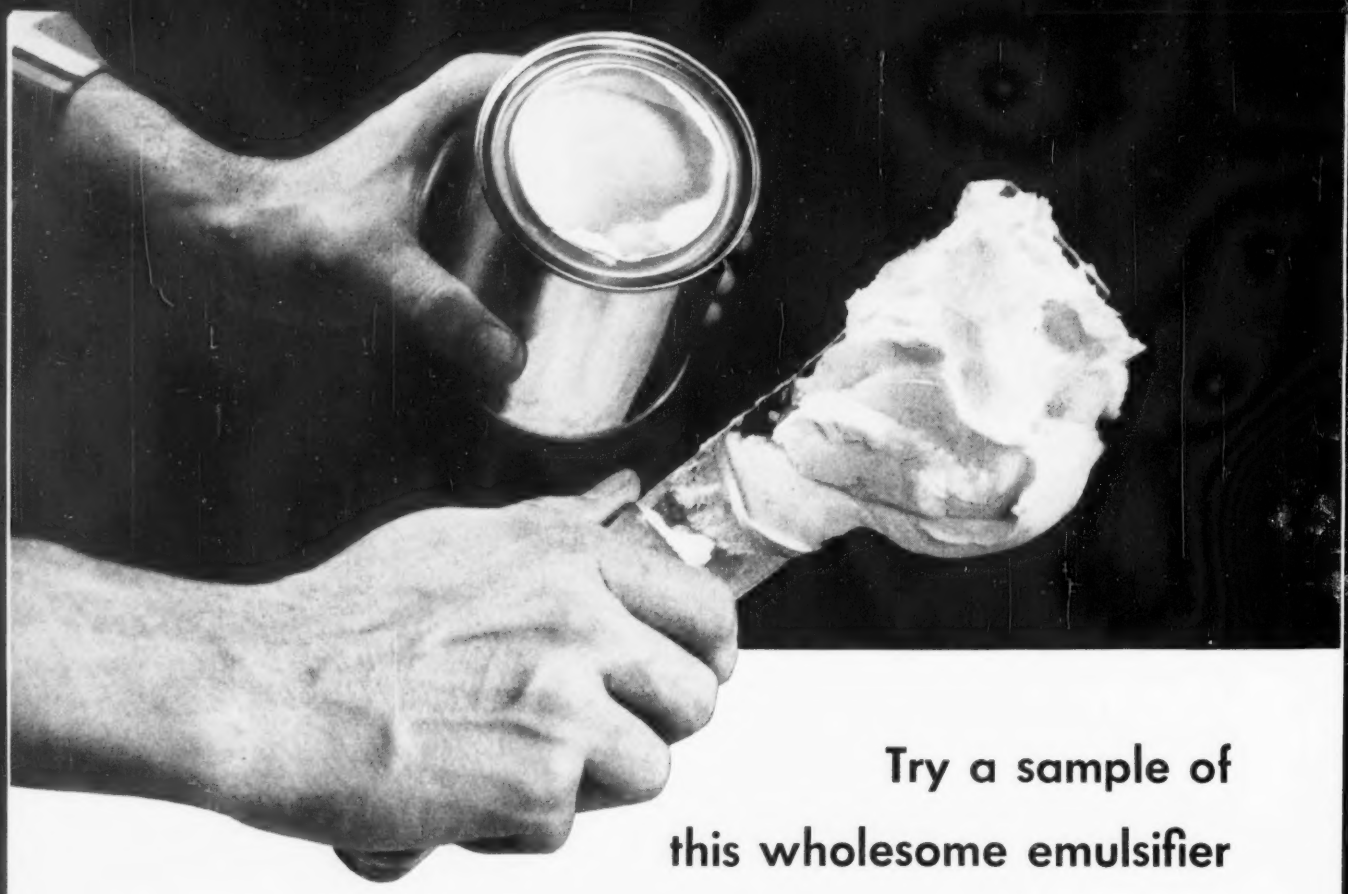
Circle 109B on Reader Service Card

## Continuous Unit Weighs, Moves Powdered Materials



Finely divided material can be automatically and continuously transported, weighed and maintained at a pre-set feed rate with the Transporto-weigher.

Unit shown in illustration is a 24 in. belt, feed machine designed to handle ground phosphate rock, (55 percent—200 mesh), weighing approximately 5 lb. per cu. ft. This particular unit will be operated at pre-set capacities between 10 and 24 tons per hr. range.



# Try a sample of this wholesome emulsifier

DPi

**distillers of monoglycerides from natural fats and oils**

It's DPi's Myverol® Distilled Monoglycerides. And, it's not only an excellent emulsifier, but a wholesome food as well.

Made from natural fats and oils and purified by molecular distillation, it contains 90% monoglycerides—is largely freed of diglycerides and other extraneous materials. The product is homogenized with nitrogen to produce a smooth, white cream of dependable uniformity.

Useful for baked goods, shortening, margarine, peanut butter, dessert toppings, and other food products, Myverol Distilled Monoglycerides are available in whatever quantities you require. We shall be pleased to send you a sample for your investigation. Just write ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith, Ltd., Montreal and Toronto.

**Also... vitamins A and E... more than 3500 Eastman Organic Chemicals for science and industry**

Integrator records on a direct reading tonnage totalizer full amount passing over the belt. Tonnage indicator, calibrated 0 to 100 percent of capacity, indicates instantaneous weighing rate. Tonnage indicator can be calibrated in ton per hr., lb. per min., or any special scale reading.

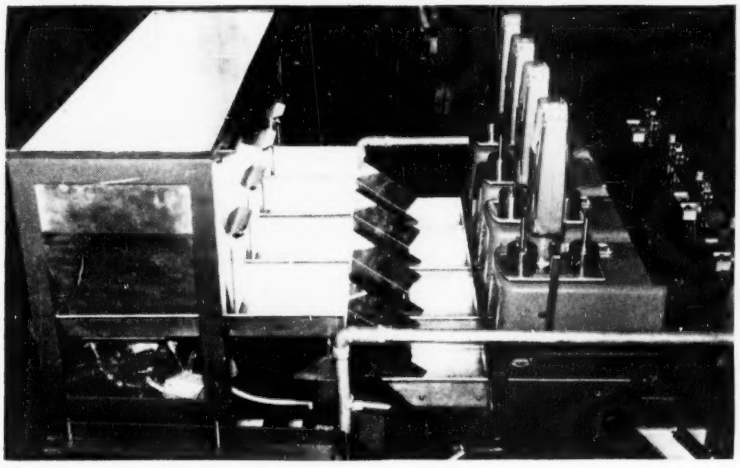
The weight integrator, mounted in dust tight cabinet, is a completely mechanical, gear differential type—speed of one side varying as conveyor belt speed, other side varying as momentary weight on suspended idlers. Output shaft is geared directly to direct reading tonnage totalizer.

Scale suspension is of the free floating type, restrained from response to longitudinal and lateral type movement by links, attached to frame.

To assure even feeding of belt and to eliminate effect of "skirt board drag" against the suspended weighing idler, material is fed on belt through two totally enclosed helix screw conveyors mounted one above the other on frame over belt. Phosphate is loaded by means of an appropriate chute or hopper into the top conveyor operating at 12-36 rpm. depending on preset feed rate. Material then passes into bottom conveyor, operating at three times speed of top conveyor, thereby assuring a steady, even feed to weighing belt. The two conveyors are driven by a variable speed drive with integrally mounted pilot motor with an adjustable speed ratio of 3:1. The 24 in. rubber covered belt is roller chain driven at 120-360 rpm. by a ¾ hp. totally enclosed motor.—*Sintering Machine Corp.*, 301 Sinter Ave., Netcong, N. J.

Circle 109C on Reader Service Card

## Scale Feeder Is Accurate, Flexible, Compact



This new net weight scale feed will operate on Models B and C Transwraps. Special features reported are close tolerance under full production conditions, flexibility in handling products, operation in synchronization with sealing stroke, and compactness of design.

Present models can be used in packaging of hard candies, wrapped or unwrapped, nuts, cookies, crackers, cocktail bits, and like products.

Equipment itself consists of four "Speed Weigh" scales incorporated into a feeding mechanism which is activated by vibrators. Product is brought to the uppermost hopper and is discharged into four intermediate feeding troughs.

These troughs feed onto lower feeding troughs which deliver product into weigh buckets by bulk and dribble feed. When unit is up to approximate weight, main trough is stopped and bucket is brought up to desired weight by a dribble trough (not clearly shown in photo).

This dribble trough does not feed directly into weigh bucket, but rather onto a shelf located near top. In this manner, machines are able to weigh from 1 oz. to 1 lb. without changing weigh buckets or encountering any variation in weights due to difference of weighing product in suspension. When dribble feed is complete, both weigh bucket and dribble shelf open simultaneously to discharge weighed product.

Stroke of bag making and sealing on Models B & C, whichever is used, is cycled by each drop of product into feeding head with Warner electric motion control. By this method, packaging production is limited only by speed of weighing required for each type of product and empty packages will not occur. Operation of scale does not interfere with use of such features as electric eye registration for printed material and special heat sealing apparatus for polyethylene and pliofilm.

In operation for bagging of 6 oz. of wrapped chocolates, each piece approximately ¼ oz., production of 52 bags per min. is being obtained with weight variations of minus nothing to plus one piece. On a second installation packaging shelled nuts, weight variations are minus nothing to plus ½ oz., with an occasional plus ⅛ oz. When product runs ⅛th over, it is due to an occasional large nut passing through dribble feed.—*Transparent Wrap Machine Corp., Hasbrouk Heights, N. J.*

Circle 111A on Reader Service Card

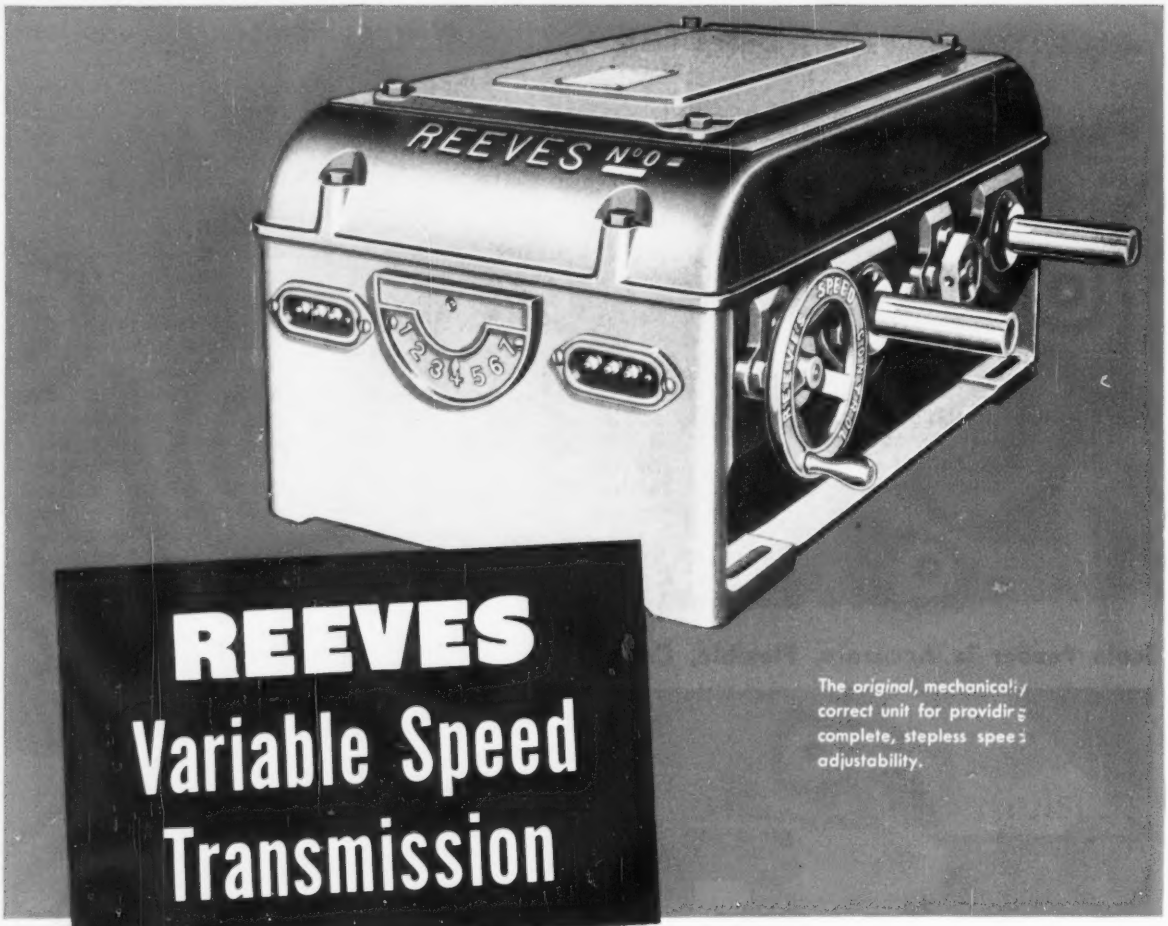
## Gage Provides Fast Check On Pressure Instruments

Periodic checks of pressure instruments—controllers, recorders, indicators—can be readily made with this 6 in. Model P test gage.

Unit is furnished in ranges of 0-30 Hg. vac. up to 0-10,000 psig. and guaranteed accurate within ½ of 1 percent of total scale at any point throughout its range. Suitable tapered pipe male thread connections are provided.

Construction is of selected materials. Case is cast aluminum, threaded to receive a brass ring which is finished to match case. Measuring element is a full 270 deg. Bourdon spring of steel or beryllium copper. Movement parts consist of chrome-plated steel pinion, segment and arbor, Monel plates, and a stainless steel hairspring. Stainless steel micrometer-adjusted pointer facilitates precision measurements on an easy-to-read dial. Durable leather carrying case, with shoulder strap, is optional.—*The Foxboro Co., Foxboro, Mass.*

Circle 111B on Reader Service Card




# REEVES Variable Speed Transmission

The *original*, mechanically correct unit for providing complete, stepless speed adjustability.

## Industry's most widely used unit for adjusting machine speeds . . . for all these good reasons:

1. Incorporates the REEVES operating principle—proved in 300,000 installations—which assures *accurate, positive* delivery of any desired speed within the entire speed range, without stopping the machine.

2. Makes "changeovers" easier—utilizes the machine's *full* capacity—by providing the *right* speed—with the turn of handwheel or touch of button—for every operation and every operator, under every changing condition.

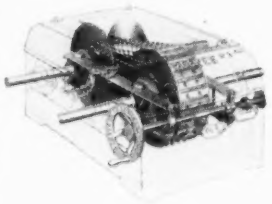
3. Wide choice of vertical and horizontal models—capacities up to 87 hp; in speed ratios of 2:1 to 16:1; manual, electric, hydraulic or completely automatic controls; suitable for mounting in any position. Also "Internals" for mounting within machine framework.

4. Easily installed on your machines. Ruggedly constructed with few moving parts subject to wear . . . requires no special tools or training to maintain.

5. Used on more different kinds of machines in a greater variety of industries than any other single variable speed drive.

Profit from REEVES Speed Control in your plant—*see immediate results.* Send for full details on REEVES Speed Control—ask for catalog No. FE68b-G.

### Operating Principle



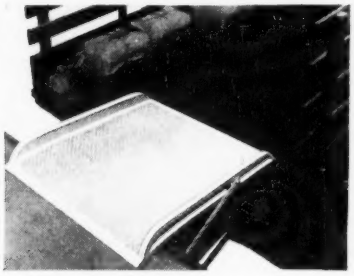
REEVES Variable Speed Transmission embodies the proved operating principle of a V-belt driving between two pairs of cone-shaped discs, mounted on parallel shafts and adjustable to form an infinite number of driving and driven diameters. One shaft receives power at constant speed from motor, line shaft, etc. Other shaft delivers power at infinitely variable speeds to driven machine. Each speed setting is held without fluctuation. Operation is practically noiseless.

**REEVES PULLEY COMPANY · COLUMBUS, INDIANA**

*Recognized leader in the specialized field of speed control engineering*

accurate · variable
**REEVES** *Speed Control*

## Lightweight Dockboard Expedites Loading



Speed and ease in truck loading operations are reported with use of this pre-fabricated dockboard.

Of all-magnesium construction, new unit combines bridge design strength with lightness and easy, one-man handling. New dock board is manufactured in two rated load capacities: 1,000 lb. and 2,000 lb. per axle.

Boards are crowned to compensate for height differences between truck and dock level, and can be reversed when truck bed is lower than dock. New automatic drop-lock securely anchors board in position and prevents slippage. Design of board permits truck to back within 3 in. of dock. —*Magline Inc., Pinconning, Mich.*

Circle 113A on Reader Service Card

## Unit Automatically Prints Copy on Shipping Cases

Display copy on sides of shipping cases is automatically printed by this machine at point of packing.

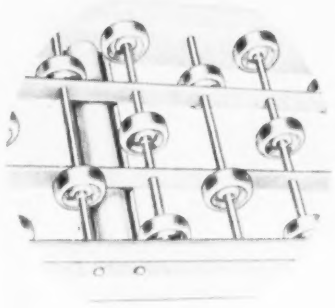
Called the Markoprinter, it enables packers of two or more product lines to eliminate pre-printed cases and, consequently, cut inventories and storage space. It also prevents loss from obsolescence of pre-printed cases; simplifies inventory control; and makes it practical to print small quantities of cases.

Designed to work equally well on corrugated, fiber and wood, unit can be installed in packaging line so that line operation remains continuous.

It prints from one to five sides of cases simultaneously, in one or two colors, at speeds up to 2,000 units per hr. Printing quality afforded by machine is said to be sharp, clean, uniform. Copy changes and adjustment for different case sizes can be "made in minutes."—*Adolph Gottsho, Inc., Hillside 5, N. J.*

Circle 113B on Reader Service Card

## Portable Conveyor Unit Is Light and Strong



Strength combined with lightweight marks this new steel-wheel aluminum-frame gravity conveyor. New model is portable unit and can take heavy loads.

Conveyor is manufactured in 45 and 90 deg. curves, 5, 8, and 10 ft. lengths, and 12 and 18 in. widths. It is available with a wide choice of wheel spacing ranging from 6 to 18 wheels to the ft.

Section 5 ft. long, 12 in. wide, with 8 wheels to the ft. weighs 23 lb. It will support a half-ton distributed load.—*The Rapids-Standard Co., Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.*

Circle 113C on Reader Service Card

## Shafts at Angle Coupled With Ball-Socket Unit

For use on all types of machinery requiring coupled shafts, either at an angle or straight line, is universal coupling that operates on ball and socket principle.

Unit features simplified construction with reduced number of working parts. Essentials of unit consist of a ball fitting into a socket with the stress of power transmission absorbed by two oversize keys. Entire assembly is held in place by a rolled and crimped cap. Bearing surfaces are heat treated and machined to close tolerances.

Reservoir in base of socket retains lubricant for slow feeding to points of wear. Absence of block and pins provides a small unit in relation to size shaft it will turn. It has maximum deflection of 30 deg. Unit is termed particularly effective at medium and high speeds.—*B. M. Root Co., York, Pa.*

Circle 113D on Reader Service Card

## White Conveyor Belting Has Poly-Vinyl Coating

For use in plants where clean, white carrier surface is desired, a new conveyor belt with a dirt and abrasion resistant poly-vinyl coating has been announced.

Pores of this belt are reported so minute that they do not readily collect dust, nor does belt surface become soiled under normal operating conditions. Although surface is very dense, belt is termed flexible and offers long service life.—*Main Belting Co., 1241 Carpenter St., Philadelphia 47.*

Circle 113E on Reader Service Card

## Removable Chop-Block Features Meat Table

Double service life and reduced maintenance costs are claimed with use of combination unit of permanent steel fixture with removable, reversible chop block, surfaced on both sides.

Chief advantage of unit is reversibility of block, reducing cost and frequency of resurfacing. Unit is easily adaptable to any layout—requires no expensive installation, and features adjustable-height legs to overcome floor irregularities and obtain stability. Reversal or exchange of block can be accomplished quickly and easily be-

# There's an "R" in TIMKEN®

HAVE you ever noticed we often spell "TIMKEN"® with an "R"? It's just to the right, near the top of the "N", and it means that "TIMKEN" is the registered trade-mark of The Timken Roller Bearing Company. It's your assurance of getting the highest quality tapered roller bearings, fine alloy steel bars, seamless steel tubing or removable rock bits.

But remember, "TIMKEN" *is* a trade-mark, not a type of product, and you'll find it only on products made by the Timken Company.

Industry has made it a habit to look for the trade-mark "TIMKEN" when buying tapered roller bearings, alloy steel bars or rock bits. Why not make "TIMKEN" your "buy word" too? There's over 50 years of experience behind it. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

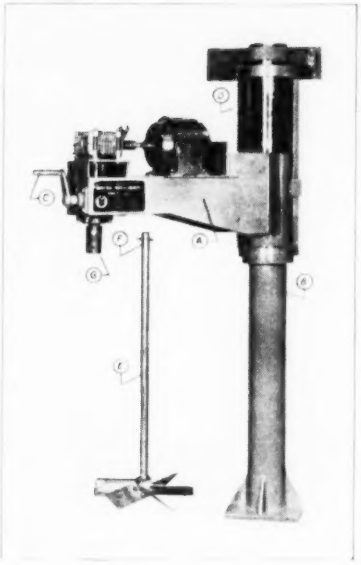
cause it is deeply grooved to slide in and out of fixture like a drawer.

Other economy features reported for the unit are: It is easy to rotate either block or fixture, thus contributing to uniform wear and thereby prolonging life of block. Only block need be replaced; fixture is one-time investment.

Unit is available in complete range of block sizes from 6 to 12 in. in depth and from 18 x 18 to 35 x 70 in. decks. —*Millor Products, Inc., Polo, Ill.*

Circle 113F on Reader Service Card

## Assembly Speeds Mixing Of Products in Drums



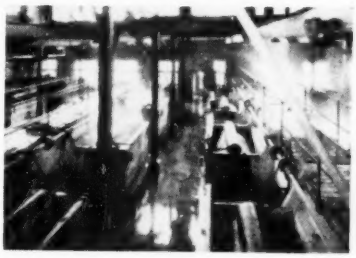
Increased production and minimum maintenance are reported with use of this change-can mixer. Unit is designed primarily for use where number of different products are made by mixing directly in cans or drums.

Features of unit are: Drive assembly (A) swings easily around post (B), which is affixed to floor and a wall or overhead beam. Unit can thus be quickly positioned over any one of a number of cans while others are being moved or prepared. Height of drive unit—and location—is adjusted through hand crank (C) and gear track (D).

Turbine agitator (E) is removable. Pitched-blade impeller and peripheral speed are designed for fast and thorough mixing. Unit is coupled to drive simply by inserting shaft end (F) into drive socket (G) and turning. A spring lock holds the two together. Disconnecting is accomplished merely by twisting and lowering, minimizing cleaning problems.—*Industrial Process Engineers, 8 Lister Ave., Newark 5, N. J.*

Circle 115A on Reader Service Card

## New Chemicals



## Plastic Resin Finish Resists Corrosion

Protection against corrosion caused by atmospheric conditions, fumes, spillage and splash of acids and alkalis is reported with application of a new platic resin finish.

Called Flexcoat, it can be brushed, sprayed or dipped and can be applied over old paints. Adhesion is termed good to metal, wood or concrete. It comes in a range of colors and is stated to contain no oxidizing oils.

Coating is complete system, primer and top coat are homogeneous. Adhesion is maintained over a wide range of temperatures.—*Flexrock Co., Protective Coating Div., 3604 Filbert St., Philadelphia 4.*

Circle 115B on Reader Service Card

## Pan Washing Material Does Thorough Job

Efficient cleaning plus safety in use on aluminum, tin, and other metals is reported for Composition No. 80-A, a material recently developed.

In extensive tests and actual use in leading bakeries, material, manufacturer states, has demonstrated marked cleaning effectiveness and safety characteristics when used in soak-tank or spray-machine washing of aluminum or tinned bread and cake pans, and tinned pans incorporating aluminized straps. Material is readily soluble in hot water and rinses easily with hot or cold water. It is claimed not to exhibit any tendency to foam excessively. —*Oakite Products, Inc., 125G Rector St., New York 6.*

Circle 115C on Reader Service Card

## Fast Drying Enamel Sets in Minutes

Signs of "Wet Paint" can be discarded with use of recently developed enamel claimed to dry in a matter of minutes.

Trademarked "Totrust Enamel Instant Dry," it is a free-flowing, high gloss, tough enamel, highly resistant to chemical fumes. It is said to be in the drying competitive field with laquers. Material is available in 24 different colors.—*The Wilbur & Williams Co., 130 Lincoln St., Boston 35.*

Circle 115D on Reader Service Card

## White Plastic Coating Used on Rubber Gloves

Of interest to meat packers, bottlers, canners, dairies and other food processors is a new coated fabric glove—No. 350 Sani-Gluv with knitwrist.

Coating is special white vinyl plastic bonded to strong white fabric liners. Coating is claimed not to chip, crack or peel. Gloves, termed highly flexible and long wearing are made on the curved-finger, wing-thumb pattern with pre-flexed finger joints.

It has a natural hand shape and comes in one size only—men's full.—*Edmont Manufacturing Co., 1291 Walnut St., Coshocton, Ohio.*

Circle 115E on Reader Service Card

### OTHER DEPARTMENTS Featured in This Issue


| | |
|---|---|
| Practical Ideas | page 5 |
| Editorials | 116 |
| New Packages & Products | 138 |
| Advances in Technology | 149 |
| Questions & Answers | 162 |
| Useful New Books | 174 |
| Keeping Up With the Field | 181 |
| Recent Inventions | 192 |
| Men & Companies | 196 |
| Just Off the Press | 201 |

# In Behalf of Progress . . .

## You Better Prepare for a Fast '53

We enter the new year at a fast pace in the food manufacturing industry.

Volume of business will be good, what with some 6,000 new food consumers sitting down at the dinner table each evening. Plenty of raw materials will be available. Economists predict a continuing high economic level—nothing worse than a "rolling readjustment" of business. And processed foods will gain a still higher proportion of total food business.

Processing and distribution cost factors are expected to be more stable this year, though with pressure for increased wages. Corporation taxes, particularly the excess profits levy, likely will be lower the last half of the year.

But the battle to improve profit margins will continue. It must. The average profit per dollar of sales was dangerously low in 1952.

The extent to which food manufacturers are trying to ease the profit squeeze is indicated by the magnitude of capital expenditures for new plant and equipment. A record $933 million was spent last year, and plans point to a 7 percent increase in 1953.

These expenditures are reflected in the ever-accelerating rate of engineering progress in the industry. In plant after plant across the country, you find new processes, equipment, and methods which are cutting unit costs and improving quality. You hear, too, from the pioneers in progress of still better things to come.

Here is a measure of the rate at which progress is being made: In one of the outstanding plants in the entire industry—and the most modern in its branch when built two years ago—some operations already have been obsoleted two and three times.

Because advancement at this speed is something new to the industry, it merits serious consideration lest you sit too long on your laurels.

And as more specific indicators of the efficiency race, let us mention some interesting examples of new developments—of things to watch and weigh:

**General**—Tremendous strides are being made in these operations: Bulk handling of both dry and liquid products. Continuous proportioning and automatic batching. Continuous blending and mixing. Continuous heat processing and cooling. Automatic process control. Vacuum cooling. Automatic handling from process to conveyor and from conveyor to pallet. Cleaning is being mechanized and simplified. And packaging is being speeded.

But the spearheads of progress become still more pointed as we consider developments in major branches of the industry.

**Baking**—Continuous bread dough mixing (now in pilot plant stage). Fast, continuous mixing of cake batter and marshmallow topping, the latter with an integrated depositor. Pushbutton bakeries.

**Beverages**—Automatic casers, uncasers, and soaker and washer feeders. New premixer in trial-run stage. Power handling and loading of palletized cases. Pushbutton syrup rooms. Fillers and labelers with greatly stepped-up speeds.

**Cereals**—Radically new techniques in making prepared mixes. Electrostatic cleaning, and x-ray inspection of grains. Weigh-belt proportioning of ingredients. Pneumatic handling. Pushbutton plant operation.

**Confectionery**—Use of liquid chocolate in bulk. Continuous marshmallow mixing, bar molding, and cooling of bar-center mix. New chocolate process.

**Dairy Products**—Continuous butter making. Continuous pH control. Automatic casing and uncasing. Faster forming and wrapping of ice cream bars. Bulk milk pick-up. Continuous making and packaging of sliced process cheese. Canning of fresh and concentrated milk. Use of ion exchange to produce canned coffee cream. Development of vegetable-oil frozen desserts.

**Fruits and Vegetables**—Three methods of short-time, high-temperature heat processing. Aseptic filling. Mechanized can palletizing and pallet loading. Recovery of volatiles. Spray waste disposal. Frozen concentrated juice in bags. New tomato-paste process.

**Meat Packing**—Quick bacon cure by injection. Immobilizing animals with carbon dioxide. Rendering fat by hot comminution and centrifuging. Mechanized carcass handling and skinning. Extruding and molding skinless sausages. Preforming and packaging meats for self-service sale.

**Other Foods**—SUGAR: Elgaunite process of refining raw sugar; automatic centrifuges; air-conditioned storage bins and packaging rooms. SOLUBLE COFFEE: Vacuum drying. MAYONNAISE: Use of preblender and continuous, nitrogen-fed mixer. SALAD DRESSING: Cooking and cooling starch-vinegar mix in plate-type heat exchangers. PEANUT BUTTER: Automatic roaster dumping; continuous cooling; use of stabilizer oil. VINEGAR: Automatically controlled giant generators.

The list is not all-inclusive. The order of mention is not significant.

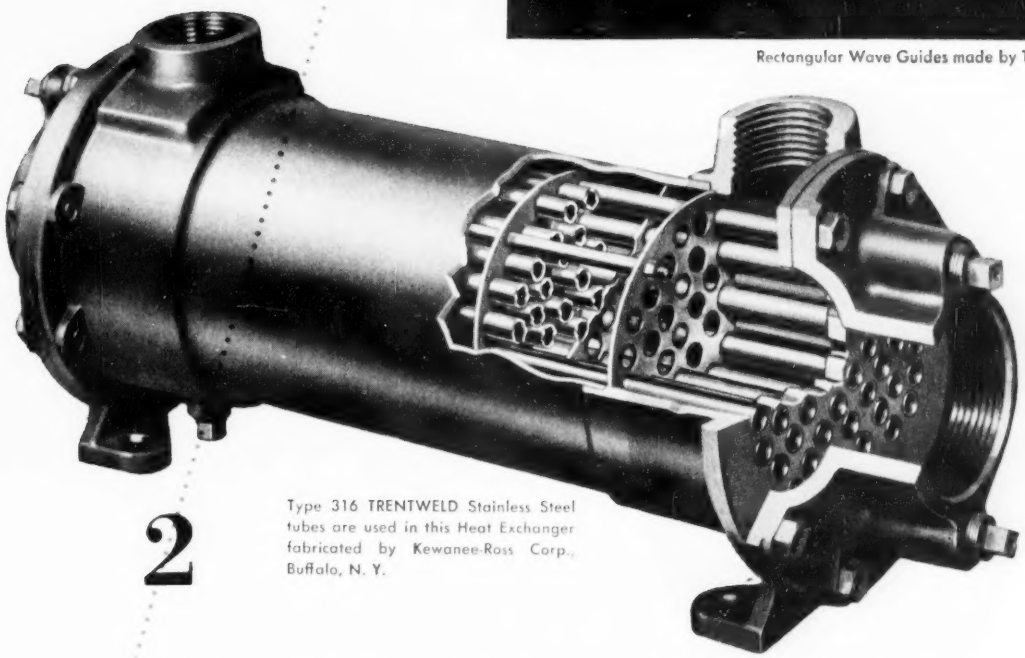
But the list points up the trend. It proves that to stand still progress-wise in 1953 is to run backwards rapidly in the competitive race.

You have two choices. Either take advantage of the new and the better. Or develop a special product of superior quality for sale to a limited market at a price that will pay a profit on inefficiency.

It would be safer to put on your running shoes.

1

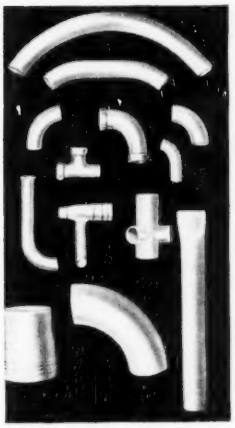
Rectangular Wave Guides made by TRENTWELD



2

Type 316 TRENTWELD Stainless Steel tubes are used in this Heat Exchanger fabricated by Kewanee-Ross Corp., Buffalo, N. Y.

*any need for stainless or high alloy steel tubing is better served with* **TRENTWELD**



3

A baker's dozen of fittings made from TRENTWELD tubing

Name the need for special types, forms or finishes of stainless or high alloy steel tubing and the name to associate with it is TRENTWELD. For throughout all industry you'll find TRENTWELD meeting exacting requirements in these highly specialized fields. That applies to stock lines in food, paper and chemical plants. It is true of heat exchanger units in processing industries; and in cooling coils in breweries, the beverage industry, dairies and dairy equipment.

TRENTWELD is available in a wide range of wall thicknesses; in a variety of grades, gauges and finishes. Call us for any requirement in stainless or high alloy tubing. Our engineers can help you.

**TRENTWELD**

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)



TURN PAGE FOR FOLDOUT FLOWSHEET →

# In Behalf of Progress . . .

## You Better Prepare for a Fast '53

We enter the new year at a fast pace in the food manufacturing industry.

Volume of business will be good, what with some 6,000 new food consumers sitting down at the dinner table each evening. Plenty of raw materials will be available. Economists predict a continuing high economic level—nothing worse than a "rolling readjustment" of business. And processed foods will gain a still higher proportion of total food business.

Processing and distribution cost factors are expected to be more stable this year, though with pressure for increased wages. Corporation taxes, particularly the excess profits levy, likely will be lower the last half of the year.

But the battle to improve profit margins will continue. It must. The average profit per dollar of sales was dangerously low in 1952.

The extent to which food manufacturers are trying to ease the profit squeeze is indicated by the magnitude of capital expenditures for new plant and equipment. A record $933 million was spent last year, and plans point to a 7 percent increase in 1953.

These expenditures are reflected in the ever-accelerating rate of engineering progress in the industry. In plant after plant across the country, you find new processes, equipment, and methods which are cutting unit costs and improving quality. You hear, too, from the pioneers in progress of still better things to come.

Here is a measure of the rate at which progress is being made: In one of the outstanding plants in the entire industry—and the most modern in its branch when built two years ago—some operations already have been obsoleted two and three times.

Because advancement at this speed is something new to the industry, it merits serious consideration lest you sit too long on your laurels.

And as more specific indicators of the efficiency race, let us mention some interesting examples of new developments—of things to watch and weigh:

**General**—Tremendous strides are being made in these operations: Bulk handling of both dry and liquid products. Continuous proportioning and automatic batching. Continuous blending and mixing. Continuous heat processing and cooling. Automatic process control. Vacuum cooling. Automatic handling from process to conveyor and from conveyor to pallet. Cleaning is being mechanized and simplified. And packaging is being speeded.

But the spearheads of progress become still more pointed as we consider developments in major branches of the industry:

**Baking**—Continuous bread dough mixing (now in pilot plant stage). Fast, continuous mixing of cake batter and marshmallow topping, the latter with an integrated depositor. Pushbutton bakeries.

**Beverages**—Automatic casers, uncasers, and soaker and washer feeders. New premixer in trial-run stage. Power handling and loading of palletized cases. Pushbutton syrup rooms. Fillers and labelers with greatly stepped-up speeds.

**Cereals**—Radically new techniques in making prepared mixes. Electrostatic cleaning, and x-ray inspection of grains. Weigh-belt proportioning of ingredients. Pneumatic handling. Pushbutton plant operation.

**Confectionery**—Use of liquid chocolate in bulk. Continuous marshmallow mixing, bar molding, and cooling of bar-center mix. New chocolate process.

**Dairy Products**—Continuous butter making. Continuous pH control. Automatic casing and uncasing. Faster forming and wrapping of ice cream bars. Bulk milk pick-up. Continuous making and packaging of sliced process cheese. Canning of fresh and concentrated milk. Use of ion exchange to produce canned coffee cream. Development of vegetable-oil frozen desserts.

**Fruits and Vegetables**—Three methods of short-time, high-temperature heat processing. Aseptic filling. Mechanized can palletizing and pallet loading. Recovery of volatiles. Spray waste disposal. Frozen concentrated juice in bags. New tomato-paste process.

**Meat Packing**—Quick bacon cure by injection. Immobilizing animals with carbon dioxide. Rendering fat by hot comminution and centrifuging. Mechanized carcass handling and skinning. Extruding and molding skinless sausages. Preforming and packaging meats for self-service sale.

**Other Foods**—SUGAR: Elgaunite process of refining raw sugar; automatic centrifuges; air-conditioned storage bins and packaging rooms. SOLUBLE COFFEE: Vacuum drying. MAYONNAISE: Use of preblender and continuous, nitrogen-fed mixer. SALAD DRESSING: Cooking and cooling starch-vinegar mix in plate-type heat exchangers. PEANUT BUTTER: Automatic roaster dumping; continuous cooling; use of stabilizer oil. VINEGAR: Automatically controlled giant generators.

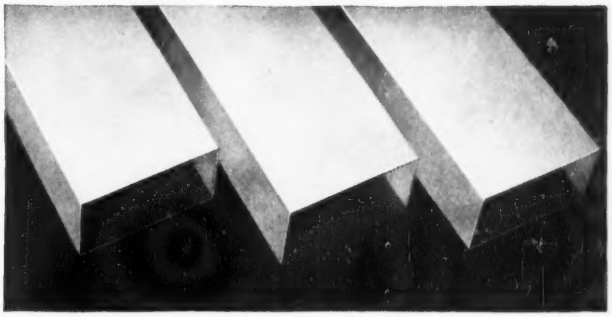
The list is not all-inclusive. The order of mention is not significant.

But the list points up the trend. It proves that to stand still progress-wise in 1953 is to run backwards rapidly in the competitive race.

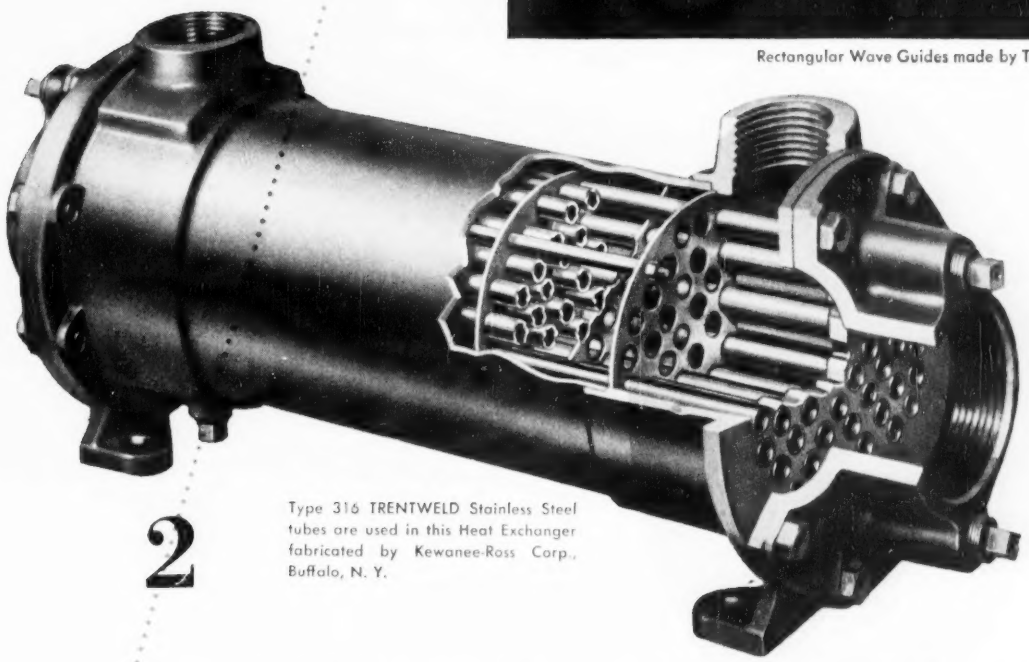
You have two choices. Either take advantage of the new and the better. Or develop a special product of superior quality for sale to a limited market at a price that will pay a profit on inefficiency.

It would be safer to put on your running shoes.

1



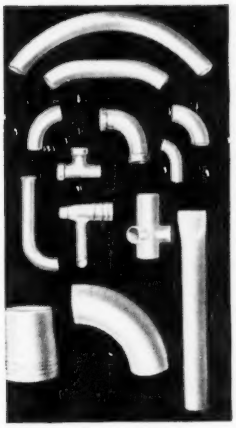
Rectangular Wave Guides made by TRENTWELD



2

Type 316 TRENTWELD Stainless Steel tubes are used in this Heat Exchanger fabricated by Kewanee-Ross Corp., Buffalo, N. Y.

*any need for stainless or high alloy steel tubing is better served with* **TRENTWELD**



A baker's dozen of fittings made from TRENTWELD tubing

3

Name the need for special types, forms or finishes of stainless or high alloy steel tubing and the name to associate with it is TRENTWELD. For throughout all industry you'll find TRENTWELD meeting exacting requirements in these highly specialized fields. That applies to stock lines in food, paper and chemical plants. It is true of heat exchanger units in processing industries; and in cooling coils in breweries, the beverage industry, dairies and dairy equipment.

TRENTWELD is available in a wide range of wall thicknesses; in a variety of grades, gauges and finishes. Call us for any requirement in stainless or high alloy tubing. Our engineers can help you.

**TRENTWELD**

**STAINLESS STEEL TUBING**

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)



TURN PAGE FOR FOLDOUT FLOWSHEET →

# New Fast Pea-Freezing Line

## Process Continuous—Viners to Freezers in 20 Min.

FIELD-TO-PLANT movements of peas for quick-freezing are coordinated by two-way radio in the system employed by Lamb-Weston, Inc., Weston, Ore. With schedules set "over the air," unthreshed vines are delivered from fields by trucks and trailers to 46 viners behind the plant—Point (A) in accompanying flowsheet.

Here, trucks are dumped and vines mechanically fed to threshers. Machines are set up in pairs, with a mechanical fork hoist common to most sets.

Threshed peas drop down to lot-specified belts, which deliver them to automatic-recording scales. These units weigh, then drop peas in 250-lb. lots into hoppers equipped with automatic gates that release the peas in a uniform flow to the monitor cleaners. These machines operate much more efficiently with the dry product than with the wet—an advantage gained by use of belts rather than fluming.

From the cleaners, peas fall into cool water flumes leading downhill to the plant proper. Here, they are fed to the froth flotation cleaners (B). Peas, including skins, weed seeds (resembling peas), and broken peas, are first immersed in a "treater" solution which prepares the material for selective bubble attachment.

Treated material is then dropped into the separation tank filled with an emulsion (oil-in-water and a detergent). Extraneous material floats and is carried off via an outlet port. Peas sink and leave via a discharge pipe going to a dewatering reel.

From this reel, peas go into a fresh-water flume, which discharges into a rod-reel washer. Emulsion-free peas drop to a picking belt, where any foreign material missed by former hydro-mechanical units is removed manually.

Cleaned peas are now flumed to blanchers, steam heated to a temperature of 190 deg. F., and then pumped to quality graders (C).

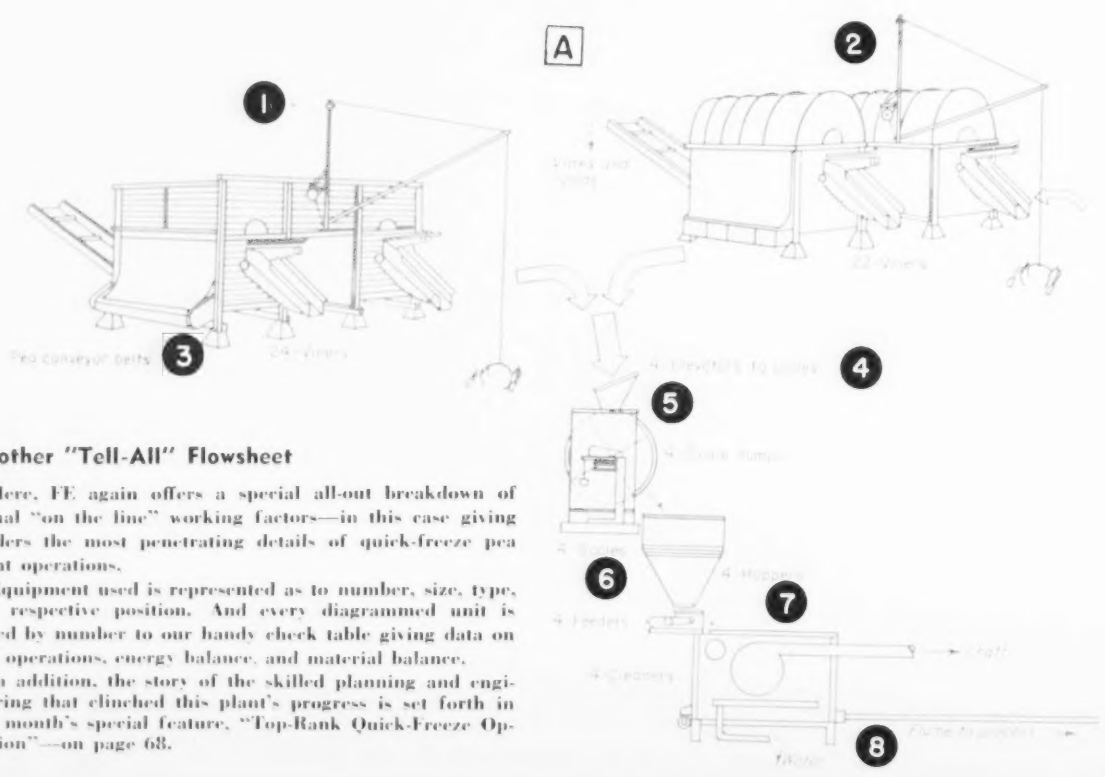
Operating continuously, the latter separate peas on the basis of their respective specific gravities. Peas enter at top, are discharged via slowly rotating paddles to a separating zone, where the fancy grade peas rise in the brine (density controlled by instrument) and flow through an outlet port into a dewatering reel. From here, fancy grade peas travel by chutes to a hopper feeding a bucket elevator that delivers them to the vibratory feed at the carton filler.

Equipment employed forms the cartons from knock-down flats, fills them with peas, closes the lids, and moves the finished packages onto conveyors leading to continuous freezers (D). Filler proper is a 12-pocket volumetric type. Elapsed time from viners to freezers is 20 min. From freezers, cartons travel via belt to labeling machines. Cartons are then cased and belt-conveyed to low-temperature storage rooms.

Standard grade peas, or sinkers, go from the grader to dewatering reels, thence to fillers. Here, peas are automatically dropped onto trays that travel through the column freezers. On leaving these freezers, trays are automatically emptied and start their return trip to the filler.

Frozen peas pass first through a cluster-buster and are moved immediately by screw conveyor to the package-filling station. Here, too, a 12-pocket volumetric filler is used. Filled packages move to carton-closer and on to labeler. Wrapped packages are cased and go to storage.

FOOD ENGINEERING January 1953 Pages 118-121




### Another "Tell-All" Flowsheet

**Here, FE again offers a special all-out breakdown of actual "on the line" working factors—in this case giving readers the most penetrating details of quick-freeze pea plant operations.**

**Equipment used is represented as to number, size, type, and respective position. And every diagrammed unit is keyed by number to our handy check table giving data on unit operations, energy balance, and material balance.**

**In addition, the story of the skilled planning and engineering that clinched this plant's progress is set forth in this month's special feature, "Top-Rank Quick-Freeze Operation"—on page 68.**

# INSIDE STORY: Data "Check" by Numbers to Diagram

## UNIT OPERATIONS

| Unit No. | Kind of Unit | Rated Cap. Each Unit (Tons/Hr.) | No. of Units in Line | Cap. All Units (Tons/Hr.) | Planned Line Balance (Tons per Hr.) Line 1 2 FM Corp. Freezers | Line 2 2 York Freezers | Line 2 2 York Freezers |
|---|---|---|---|---|---|---|---|
| 1 | Clinkette Rocker Vanes | 0.5 | 46 | 23.0 | | | |
| 2 | Scott Vanes | | | | | | |
| 5 | Conv. Belt #1 | 11.0 | 1 | 11.0 | | | |
| 7 | Conv. Belt #2-A | 8.0 | 2 | 16.0 | | 3.0 | 3.0 |
| 4 | Conv. Belt #3 | 4.0 | 1 | 4.0 | 3.0 | | |
| 4 | Elevators | 3.5 | 4 | 14.0 | 3.0 | 3.0 | 3.0 |
| 5 | Hour Co. Scales | 4.0 | 4 | 16.0 | 3.0 | 3.0 | 3.0 |
| 6 | Electric Feeders | 6.0 | 4 | 24.0 | 3.0 | 3.0 | 3.0 |
| 7 | Mounted Cleaners | 6.0 | 4 | 24.0 | 3.0 | 3.0 | 3.0 |
| 8 | Frames | 5.0 | 4 | 20.0 | 3.0 | 3.0 | 3.0 |
| 9 | Key Enrth Cleaners | 5.0 | 2 | 10.0 | 3.0 | 3.0 | 3.0 |
| 10 | Rod Rod Washers | 4.0 | 12 | 48.0 | 3.0 | 3.0 | 3.0 |
| 11 | Picking Belts | 1.0 | 12 | 12.0 | 3.0 | 3.0 | 3.0 |
| 12 | Elevators | 3.5 | 4 | 14.0 | 3.0 | 3.0 | 3.0 |
| 13 | Monitor Blanchers | 3.5 | 4 | 14.0 | 3.0 | 3.0 | 3.0 |
| 14 | Scott Pump | 5.0 | 2 | 10.0 | 3.0 | 3.0 | 3.0 |
| 15 | Key Quality Graders | 5.0 | 2 | 10.0 | 3.0 | 3.0 | 3.0 |
| 16 | Cornerland Pump | 4.0 | 2 | 8.0 | 3.0 | 3.0 | 3.0 |
| 17 | De Water Reel | 4.0 | 1 | 4.0 | 3.0 | | |
| 18 | Elevator Reel | | 1 | ---- | 3.0 | | |
| 19 | F. M. Corp Bucket Elevator | 5.0 | 1 | 5.0 | 3.0 | | |
| 20 | Syntron Vibrator | | 1 | 5.0 | 3.0 | One of the four York Freezers | |
| 21 | F. M. Corp Marquis Filler | 5.0 | 1 | ---- | 3.0 | being defrosted | |
| 22 | F. M. Corp Freezers | 1.66⅔ | 2 | 3.32⅔ | 3.0 | | |
| x22 | MG sets (for above freezers) | | 2 | ---- | | | |
| x23 | Rex De Water Screen | | 4 | 6.0 | | | |
| 24 | York Cabinet Freezers | 1.5 | 4 | 6.0 | | 3.0 | 1.5 |
| 25 | York Turbo Compressor | | 1 | ---- | | | |
| x26 | Weinman Freon Pumps | | 8 | | | | |
| x27 | York HW Freon Comp. | | 1 | | | | |
| 28 | Servo Conveyors | | 4 | 6.0 | | 3.0 | 1.5 |
| 29 | Ironclad Carton Former | 4.0 | 1 | 4.0 | | 3.0 | 1.5 |
| 30 | F. M. Corp Carton Filler | 4.0 | 1 | 4.0 | | 3.0 | 1.5 |
| 31 | Ironclad Carton Closer | 4.0 | 1 | 4.0 | | 3.0 | 1.5 |
| 32 | Marquis Filler | 5.0 | 1 | 5.0 | | 3.0 | 1.5 |
| 33 | Pkg. Machinery Co. Wrapper | 4.0 | 1 | 4.0 | | 3.0 | 0.5 |
| 34 | Pkg. Machinery Co. Carton Wrapper | 1.5 | 4 | 6.0 | 3.0 | 2.0 | 1.0 |
| 35 | Standard-Knapp Case Glazer | | 2 | | 3.0 | 3.0 | 1.5 |
| 36 | Storage Conveyor | | 1 | | 3.0 | 3.0 | 1.5 |
| x37 | York Compressor for Stg. Rm. | | 2 | | | | |
| x38 | Storage Cooling Units | | 2 | | | | |
| Service Units | | | | | | | |
| x38 | Defrosters | | 2 | | | | |
| x39 | Boiler | | | | | | |
| x40 | Well-Water Pump | | 2 | | | | |
| x41 | Water Pump | | 1 | | | | |
| x42 | Water Pump | | 2 | | | | |
| x43 | Water Pump | | 1 | | | | |

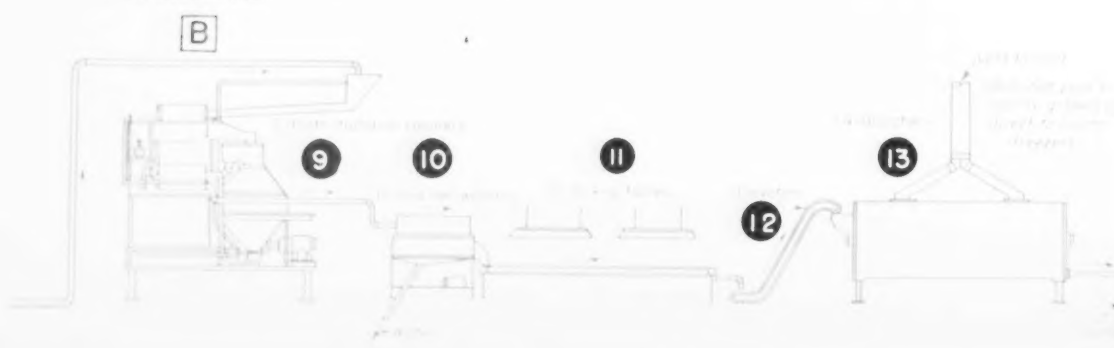
## ENERGY BALANCE

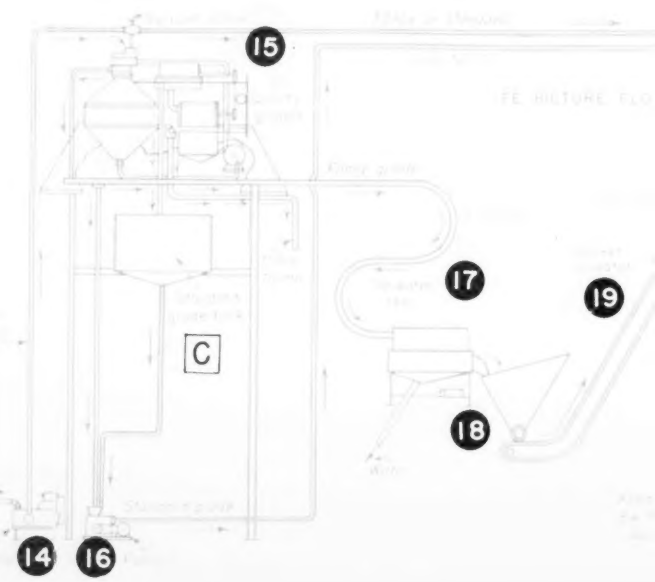
| Unit No. | Elec. Hp. Each Unit | Total Elec. Hp. All Units | Refrigeration (Tons) | Water Gpm. (R = Reused Water) | Steam Hp. | Steam Deg. F. | Unit Temp. Deg. F. | Product Temp. Enter Deg. F. | Product Temp. Exit Deg. F. | Other Kind |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15 | 500 | | | | | | | | Gaso |
| 5 | 3 | 3 | | | | | | | | |
| 7 | 2 | 4 | | | | | | | | |
| 4 | 1 | 1 | | | | | | | | |
| 4 | 2¾ | 11 | | | | | | | | |
| 5 | ½ | 1½ | | | | | | | | |
| 6 | ½ | 2 | | | | | | | | |
| 7 | 7½ | 30 | | R 160 | | | | | | |
| 8 | | | | | | | | | | |
| 9 | 11½ | 23½ | | 10 | | | | | | |
| 10 | ¾ | 9 | | 120 | | | | | | |
| 11 | 1 | 12 | | R 120 | | | | | | |
| 12 | ¾ | 3 | | 20 | | | | | | |
| 13 | 2 | 8 | | 20 | 180 | 215 | 190 | 70 | 190 | |
| 14 | 10 | 20 | | 120 | | | | | | |
| 15 | 5 | 10 | | 10 | | | | | | |
| 16 | 10 | 20 | | 100 | | | | | | |
| 17 | ¾ | ¾ | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | 2 | 2 | | | | | | | | |
| 20 | ½ | ½ | | | | | | | | |
| 21 | 2 | 2 | | | | | | | | |
| 22 | 10 | 10 | | | | | 36 | 68 | 0 | |
| x22 | 7½ | 15 | | | | | | | | |
| x23 | ¾ | 3 | | | | | | | | |
| 24 | 27 | 108 | | | | | 36 | 68 | 0 | |
| 25 | 800 | 900 | 2.4 | 1,100 | | | 34—42 | | | Freon |
| x26 | 4 | 32 | | | | | | | | |
| x27 | 10 | 10 | 6 | | | | | | | Freon |
| 28 | 2 | 8 | | | | | | | | |
| 29 | | | | | | | | | | |
| 30 | 2¼ | 2¼ | | | | | | | | |
| 31 | | | | | | | | | | |
| 32 | 2 | 2 | | | | | | | | |
| 33 | 4½ | 4½ | | | | | | | | |
| 34 | 4½ | 18 | | | | | | | | |
| 35 | 2¼ | | | | | | | | | |
| 36 | 3 | 3 | | | | | | | | |
| x37 | 100 | 200 | 110 | 250 | | | 10 | | | Ammo |
| x38 | 20 | 40 | | | | | | | | |
| x38 | 15 | 30 | | 20 | | | | | | |
| x39 | | | | 10 | 300 | | | | | |
| x40 | 150 | 300 | | 2,500 | | | | | | |
| x41 | 16 | 16 | | | | | | | | |
| x42 | 10 | 20 | | | | | | | | |
| x43 | 5 | 5 | | | | | | | | |

Note — Above data predicated on 24 hr. daily operation; production at rate of capacity of 175 tons of finished product, and with average recovery of pelled peas based at 20 percent.

Following "x" prefixed units are not shown diagrammatically. However, positions of first four are indicated by respective numbers in flowsheet.

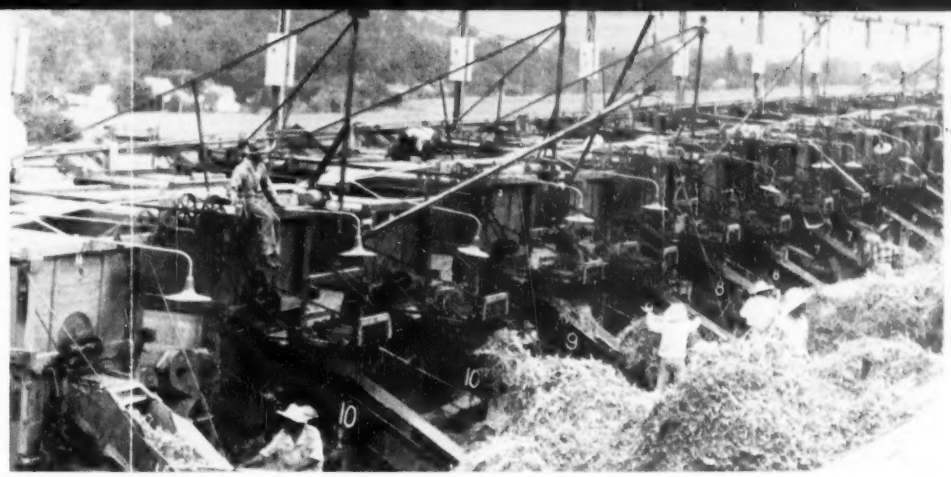
x22 Each 5 hp. F. M. Corp. continuous freezer motor is driven by dc current supplied from a 5 hp. MG set (7½ hp. full load input) for variable speeds (4 Reliance Vari-Speed and 4 General Electric Speed Variator).
x23 Press de-watered for York Freezers.
x26 Pump liquid Freon to F. M. Corp & York Freezers.
x27 Maintains 10 deg. F. in 2 F. M. Corp. Freezer Rooms.
x37 Maintains 10 deg. F. in Storage Room.
x38 Storage Fans and Defrosters.
x39 Boilers.
x40 Plant water source.
x41 Pumps re-used water to 7.
x42 One pumps water to 24, other pumps fresh water to 7.
x43 Additional pump.



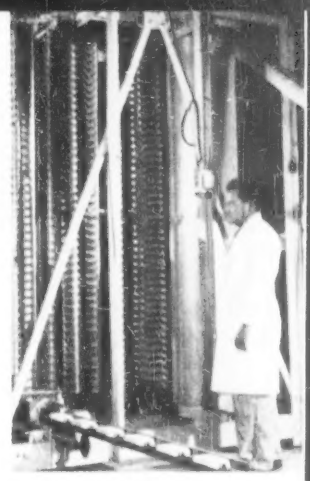



## MATERIAL BALANCE

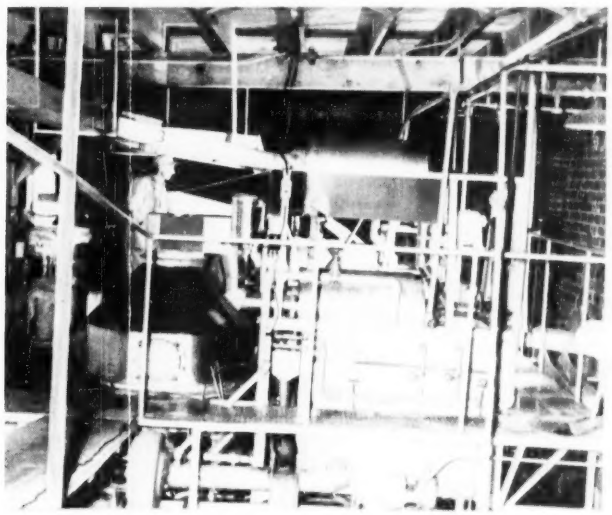
| ct | Other Energy | | | Units Per 1,000,000 lb. of Podded Peas | % of Balance |
|---|---|---|---|---|---|
| F.) | Kind | Units | Product or Material | | |
| | Gasoline | 225 Hp. | Pods & Vines (80%) | | 100.0 |
| | | | Podded Peas (20%) | | 100.0 |
| | | | | | $1.0 |
| | | | Oil (Deolgase) | 200 gal. | |
| | | | Detergent (Orvus) | 200 lb. | |
| | | | Salt | 45,000 lb. | |
| | | | | | $2.3 |
| | | | Leaching incurred at 9, 13, 15, etc. | | |
| | | | Cartons (10 oz.) | 1,601,000 | |
| | | | Cases | 6,800 | |
| | | | Dessication by Freezing | | $1.8 |
| | Freon 12 | 11,000 lb. | | | |
| | Freon 12 | 50 lb. | | | |
| | | | Cartons (2½ lb.) | 400,000 | |
| | | | Cases | 3,400 | |
| | | | Waxed Paper 10 oz. | 7,500 lb. | |
| | | | Waxed Paper | | |
| | | | Waxed Paper 12 oz. | 8,000 lb. | |
| | Ammonia | 1,000 lb. | | | |



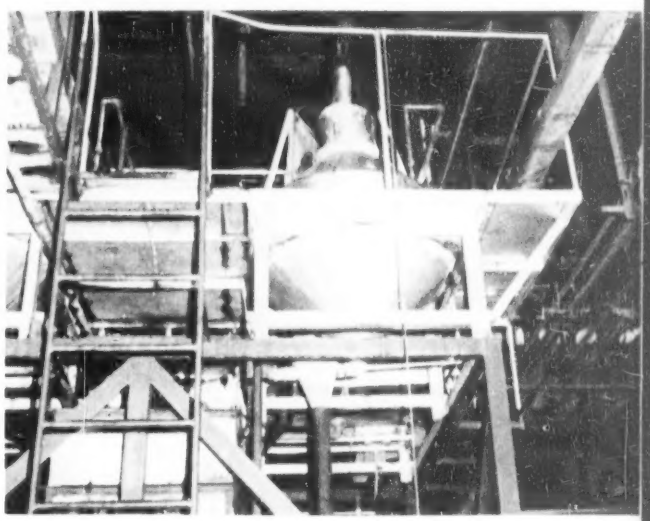
A **UNTHRESHED VINES** from fields are trucked to these 16 viners stationed at plant. Equipped with mechanical feed regulators, viners are set in pairs, with electric hoist common to most pairs.



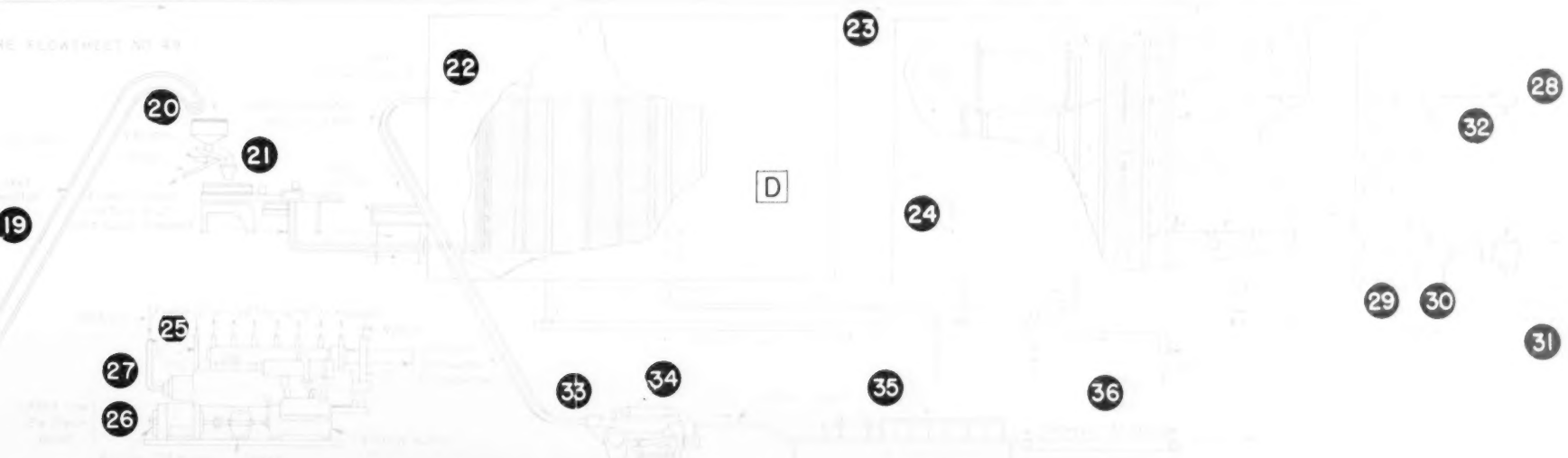
D **PACKAGED** peas are frozen in this unit.



B **IN THESE** froth-flotation cleaners, peas and extraneous material are separated by selective bubble attachment.



C **CLEANED,** blanched peas are separated on the basis of their respective specific gravities in this quality grader.



# "Stretches cloth life with just a handful of CELITE"

## *From a Celite Field Engineer's report on apple pressing*

"THE FOREMAN of this apple pressing plant in my territory is well satisfied with the benefits obtained since they began to sprinkle a handful of a Celite* Pressing Aid on the cloths before pressing.

"Now when the cloths are opened up, the cake snaps out cleanly—they no longer have to beat them with sticks to remove the pomace. Washing is required less frequently, with the net result that cloth life has been greatly increased."

• • •

Longer cloth life is one of several money-saving reasons why more and more fruit processors are using Celite Pressing Aids. Faster production, clearer juice and higher yields are other important benefits that are obtained when these diatomite powders are added in small amounts to the pulp before pressing.

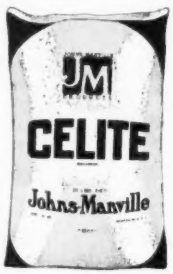
### HOW CELITE PRESSING AIDS WORK

The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter. This opens up countless minute channels through which the juice can escape, freely and at lower pressure. More juice is thus extracted in less time. The drier cake is more easily removed and the cloths can often be re-used without washing.

Celite Pressing Aids are used with practically all types of fruit products. No special equipment is needed and the benefits they assure will usually more than pay for the small amounts of powder required.

### IF YOU FILTER

Celite Filter Aids can bring you corresponding benefits in faster production, sparklingly clear juices, longer filtration cycles. They are available in 9 grades of particle fineness, each designed for a special filtering requirement. A Celite Engineer will be glad to give you all the facts.




*Reg. U. S. Pat. Off.

**For further information, write Johns-Manville, Box 60, New York 16, N. Y.**

JOHNS-MANVILLE JM PRODUCTS

**Johns-Manville CELITE**

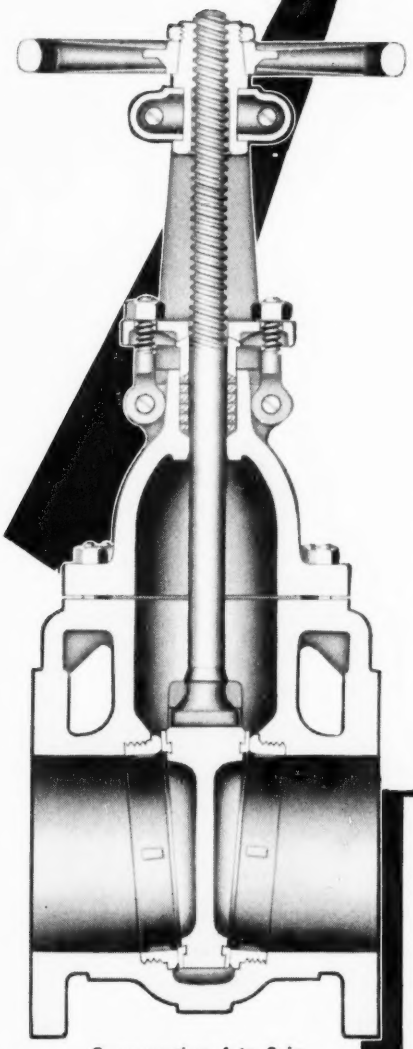
**PRESSING AIDS**

# cut the high cost of corrosion

## IN MANY SERVICES...WITH

# CRANE *Ni-Resist*

## CAST IRON GATE VALVES



Cross-section 4 to 8 in. sizes; bolted bonnet joint; flanged ends.

Here is a line of "cast iron" gate valves with a special talent for resisting corrosion, erosion and wear. Use them with safety where the strength of ordinary cast iron is adequate—in soda and sulfate pulp mill service—on creosote lines in wood treating processes—for handling sour distillates and crudes in petroleum refining—and many similar services.

Clue to the extra staying-power of Crane Ni-Resist Cast Iron Valves is in their make-up (approximately 14% nickel, 2½% chromium, and 6% copper)—and in their 18-8 Mo Alloy Steel stem and seating faces. Not to be overlooked is the fine Crane design that gives you a strong body and bonnet without excessive weight, a well-proportioned stem with precision-cut threads, a sturdy yoke, and the dependable disc-stem connection that assures smooth operation and tight seating of the solid wedge disc. Ask your Crane representative for full details, or see your Crane Catalog.

### THE CRANE NI-RESIST LINE

**Working Pressures:**
**Cold Water, Oil, or Gas, Non-shock**
**Screwed Valves—225 pounds**
**Flanged Valves—200 pounds**

**Available in sizes ½ to 8 in. All have solid wedge disc, with outside screw and yoke. Sizes ½ to 3 in. have clamp type bonnet joint and one-piece bolted gland. Sizes 4 to 8 in. have conventional bolted bonnet joint and two-piece bolted gland.**

No. 1671 with Bolted Bonnet Joint, Flanged ends only. Sizes 4, 6 and 8 in.

No. 1670 with Clamp Type Bonnet Joint with screwed ends. Sizes ½ to 2 in. Also with flanged ends 1 to 3 in.

***The Complete Crane Line Meets All Valve Needs. That's Why* More Crane Valves Are Used Than Any Other Make!**

# CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
*Branches and Wholesalers Serving All Industrial Areas*

***VALVES • FITTINGS • PIPE • PLUMBING • HEATING***

# JAMISON DOORS
## selected for HARD USAGE

**5'6" x 7'6" DOORS PROVIDE ADEQUATE CLEARANCE FOR ELECTRIC TRUCKS.** Truck operator nudges door open without dismounting. Heavy No. 14 gauge galvanized sheet steel protects lower four feet of Vestibule Doors. Upper portion of doors is protected by No. 20 gauge steel.

## *Associated Grocers of Oklahoma make selection after detailed study*

Every grocery distributor recognizes the importance of speed in handling perishables. And every warehouse manager knows too that speed in a warehouse can result in high maintenance and operating costs of cold storage rooms.

To make sure their cold storage rooms operated at maximum efficiency, the Associated Grocers of Oklahoma made a detailed study of all types of doors before making a final selection. Jamison Doors were selected because:

1. Jamison Cold Storage Doors provide highest sealing efficiency available anywhere.
2. Jamison Vestibule Doors insure a minimum escape of cold air from rooms during in-and-out traffic.
3. Construction of Jamison Cold Storage Vestibule Doors provides maximum protection against rough usage by materials handling equipment.

Jamison Doors invite and challenge comparison. Compare the construction features of these doors yourself. Write today for catalog. JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD., U.S.A.

**BUMP OPEN BAR OPENS COLD STORAGE DOOR FROM INSIDE.** A push on the vestibule door from the inside contacts the bump open bar. As bar is depressed, fastener releases hold on door. Doors can be opened from inside without manually operating the fastener. Mr. M. Rabinowitz, Gen. Mgr. of Associated Grocers, points to Bump Open Bar.

**HEAVY COLD ROLLED STEEL SHAFT SUPPORTS DOORS FROM TOP TO BASE.** A two-way gravity cam automatically closes batten doors, keeping loss of cold air at a minimum during in-and-out traffic.

JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

*The leader for over 50 years*



For more information, use coupon on last page.

# PROSPERITY in the USA: Who Has It?

How prosperous *are* the people of the United States?

The previous editorial in this series answered this question for the average American. His prosperity has increased only slightly in recent years.

But the average tells only a part, and in many ways not the most important part of the story. Which individuals and groups have prospered more, which less? (The average, the result of a statistical calculation rather than a creation of flesh and blood, tells nothing about that.)

The purpose of this message is solely to get at the facts on this question of how prosperity is distributed. This is not easy. In spite of the crucial importance of the subject, the available information is limited. Even so it is possible to provide a rough answer to the question, "Who has the prosperity?"

## We Have Had a Revolution

The distribution of income in the United States has changed so greatly in the past twenty years that Arthur F. Burns, Research Director of the National Bureau of Economic Research, world renowned for its impartiality and technical competence, calls it "one of the great social revolutions of history." A part of this revolution is portrayed by the following table which shows that individual incomes are both much larger and much more evenly distributed than they were twenty years ago. Clearly, a large new middle-class has been created.

**DISTRIBUTION OF REAL INCOME**

| Dollars of Income* | Per Cent of Families in Each Income Group | |
|---|---|---|
| | *1929* | *1951* |
| Under 1,000 | 17% | 13% |
| 1,000 – 2,000 | 24 | 15 |
| 2,000 – 3,000 | 24 | 18 |
| 3,000 – 4,000 | 14 | 18 |
| 4,000 – 5,000 | 6 | 15 |
| 5,000 – 7,500 | 9 | 14 |
| 7,500 and over | 6 | 7 |
| | 100% | 100% |

*Adjusted for price changes to give the dollar its 1951 purchasing power.

Some light on why this income revolution has taken place can be found by tracing incomes to their source. Since 1929, for instance, employees have clearly made the biggest gains in total income. This can be seen in the next table. People who own their own businesses have done second best. Farmers, who are often thought to be doing handsomely indeed, have been outstripped in the income race by employees and businessmen. People whose incomes depend upon pensions, insurance policies, and other relatively fixed returns such as rent, interest and dividends have lagged far behind.

**HOW REAL INCOME HAS CHANGED***

| Types of Income | Percentage Change 1929 to 1951 |
|---|---|
| Wages & salaries of employees. | +123% |
| Income of professional men & unincorporated business .... | +108 |
| Farm operators' income ..... | +56 |
| Rental income ..... | +1 |
| Dividends ..... | +2 |
| Interest ..... | —35 |

*In this and the previous table account is taken of changes in the cost of living. But adjustment for the changing tax load was not possible, as it is in the computations which follow.

## The Biggest Gains

Employees have made the biggest gains in income, but the term "employees" covers a wide assortment of people—from the presidents of the biggest corporations to factory sweepers. How have different groups of employees prospered? Some indication is provided by results of a survey of salaries in 41 corporations made by Arch Patton of McKinsey and Company and recently summarized in the *Harvard Business Review*. This survey showed that between 1939 and 1950, after adjustment both for higher living costs and for higher taxes, factory and office employees made modest gains in income while management personnel suffered losses ranging from 40% to 60%.

While factory and office workers generally have made greater income gains than others, their gains have varied greatly from industry to industry. During the past five years, for example, steel workers' take-home pay (adjusted for both taxes and price changes) has increased by 22%, that of textile workers 9%, employees of general merchandise stores 4%, and that of laundry workers not at all.

## What About Organization?

How have organized workers fared compared to unorganized workers? There is no round-up of facts that makes possible a direct comparison between the two. Such evidence as there is shows it is indeed an open question whether union members have done any better than others. Steel workers, for instance, who are strongly unionized are among the highly paid manufacturing workers. Farm workers are generally not unionized, and they work in one of the most competitive industries in America.

But farm workers have made income gains which far surpass those of steel workers. Real wages of farm workers increased 2½ times more than those in the steel industry between 1939 and 1952. This fact may prove nothing more than that, in a period of inflation and manpower shortage, the less skilled workers whose incomes are ordinarily low, make the biggest percentage gain in income. Further support for this conclusion is found in the construction industry where real wages of unskilled labor increased 37% between 1939 and 1952, while those of skilled labor increased only 4%.

## Why Most Incomes Are Higher

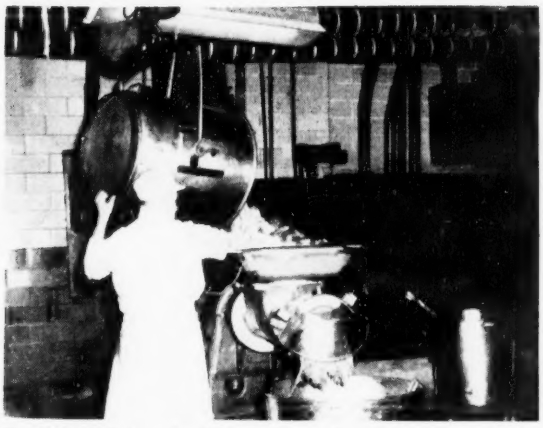
Prosperity, who has it? We may conclude that workers have been getting much more of it lately than managers or property owners, that unskilled wage and salary earners have made the largest gains, and that income generally is much more evenly distributed.

Where has the money come from to raise low bracket incomes? It has come partly from an increase in the total national income, but partly also from cutting down the share received by people in the highest income brackets. While the top 5% received 33.5% of the income after taxes in 1929, their share of income has now been cut about in half. For every $11 of increase in income to the lower 95% of income receivers, about $7 has come from increased production, and about $4 by taking that amount from the top 5%.

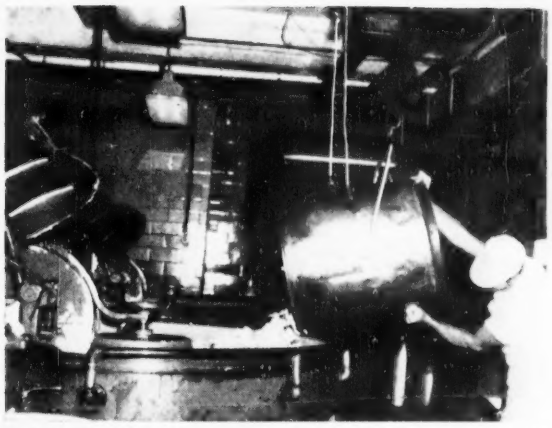
Top bracket incomes have now been cut so deeply that the possibilities of increasing the income of the rest of the people by "soaking the rich" have largely disappeared. Indeed, if all of the income after taxes of everyone earning over $25,000 in 1951 was taken away and redistributed among the remaining Americans, each person would receive only about $65.

The significance of this revolution in income distribution is clear. It is that there is only one way by which the great mass of us Americans can continue to increase our individual prosperity. This is by earning the increase through more and more efficient production. In plotting the economic course of the U.S.A. this fact is of decisive consequence.

***McGraw-Hill Publishing Company, Inc.***

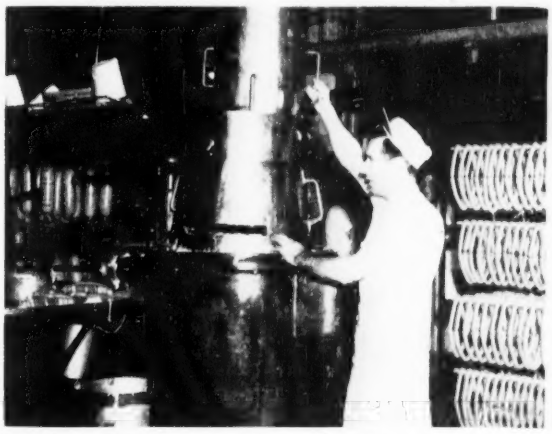


**1** **BUCKET** is raised by hoist, and meat is dumped into grinder. Method eliminates former hand-shoveling.



**2** **NEXT**, ground meat collected in bucket is railed to silent cutter, and mixed with other ingredients.

**3** **THEN** sausage meat is loaded in dolly truck, which is canted to feed meat into floor-level chute.



**4** **FINALLY** meat drops into automatic stuffer on floor below. Meat is forced into casings, ready for smoking.

# Output Up 50% *by Mechanizing*

Stahl-Meyers' new meat-handling system slashes processing time in sausage kitchen, increases stuffing capacity one-third, and saves man-hours

**FE STAFF**

Above all, you need adequate room in your plant—if you are going to operate efficiently.

For when your work areas are cramped, activities become shipshod, with employees bumping into each other, materials getting blocked off, and handling equipment becoming hobbled.

This was the problem—but not for long—in the sausage kitchen at Stahl-Meyer, Inc., N.Y.C.

Briefly, the operations of preparing and then stuffing sausage meats into casings were carried out in one small room on the second floor. Consequently, considerable confusion was created, and production line performance suffered.

Meat trucks cluttered the floor. Materials had to be fed manually into processing machines with shovels—meat trimmings into grinders, ground meat into silent cutters, and the final sausage meat into stuffers.

Movement of smoke trees was also inefficient. Loaded trees traveled from stuffers to smokehouses and then to packing room. Empty trees were returned on the same overhead monorail. And when a loaded tree smacked into a returning empty, one had to be switched off the rail.

Moreover, girls operating the sausage-linking machines had to wait or search for empty trees.

This system not only adversely affected line performance, but the work was back-breaking and workers sometimes met with accidents.

## Operations Split, Speeded

In short order, management of this firm came up with the solution—preparing and stuffing sausage meats in separate rooms and installing a circular monorail for free movement of smoke trees.

Speed-up at meat grinders, silent cutters, and stuffing machines has been attained through the installation of

Five basic types of gear-motors are also available with Fluid Drives.

Master Fluid-Drive units make use of a fluid coupling so designed that it can be interposed easily between the motor shaft and the output shaft (or motor shaft and first stage of gears of a gear-motor). Use Master Fluid-Drive Motors and gain these advantages.

**SMOOTH ACCELERATION.** With the fluid drive, the load is gradually accelerated . . . no sudden jerk at starting.

**FULL POWER.** Since there is no load on the motor when it starts, it very rapidly attains full running speed and the duration of the starting current inrush is greatly reduced.

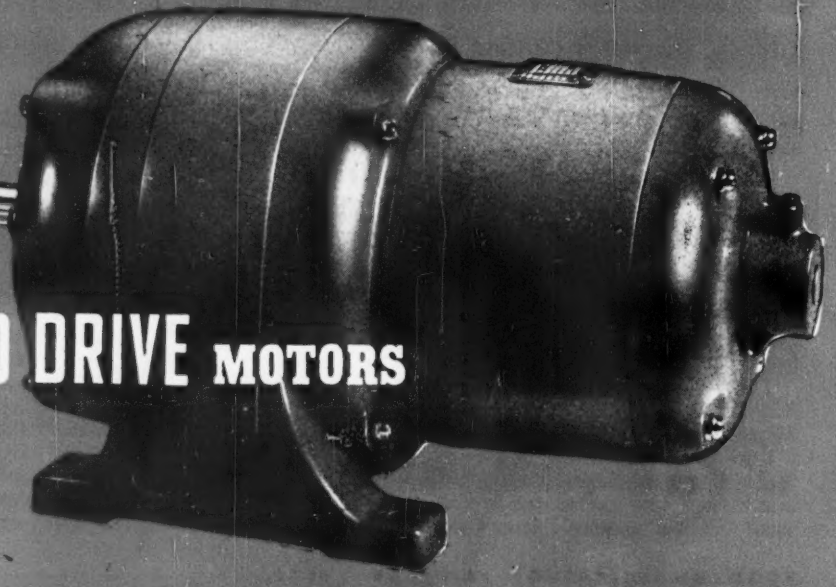
**CUSHION EFFECT.** Provides cushioned starting . . . protects motors, gears, and driven equipment from damage from severe shock loads.

**WIDE APPLICATION.** Fluid-Drive Motors are ideal for high inertia applications where it takes a long time to bring the load up to speed . . . for starting crane travel drives without jerking and swinging the load . . . for conveyor drives especially where they are handling fragile material . . . for agitators, textile machinery, presses, extruders, winding machinery, food machinery, laundry machinery, ball mills, calenders, machines, etc.

**cushioned power**

**SIZES.** Master Fluid-Drive Motors are available in sizes approximately ½ to 15 horsepower.

**THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO**



MASTER

# FLUID DRIVE MOTORS

quicker, more direct handling methods.

As a result, there has been a notable rise in operating efficiency. Sausage-stuffing capacity was notably increased, and output from the kitchen was raised one-half.

Now for point-by-point details on how this packer improved the operations:

The preparation of sausage meats—grinding meat trimmings and mixing the ground meat with other ingredients—is now carried out on the third floor.

Trimmings are first weighed in 500-lb. capacity, stainless steel dump buckets. Specially designed, these buckets are equipped with two short 1-in. dia. rods, flanged at the end. A U-shaped yoke, attached to an electric hoist, is hooked onto the rods. The hoist raises the bucket off a dolly, and the meat trimmings are emptied into the hopper feeding the grinding machine.

### Safeguards Included

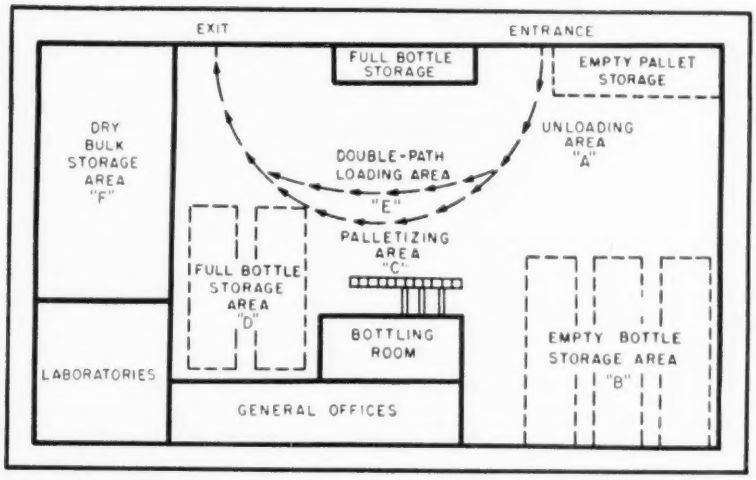
A U-clamp—a safety device—on top of the bucket prevents it from tipping while being suspended. And two metal handles on the bottom enable the worker to unload the meat into the machines.

Ground meat is collected in a similar bucket and moved via overhead monorail to silent cutters. The meat is dumped into this combination chopping and mixing machine, and blended with the other ingredients.

Each 400-lb. batch of sausage meat is now discharged through the bottom of a silent cutter and collected in a specially designed stainless steel truck. This truck is mounted on an undercarriage with four wheels (a small and a large pair), arranged in a diamond pattern.

Sausage meat is then gravity-fed through four stainless steel chutes (15-in. dia. x 10-ft.) directly into stuffing machines. A hook, attached to an

(*Turn to page 132*)




**A-B-C** of new materials handling system. Trucks follow path (arrows) from entrance to exit of plant, stopping at (A) for removal of palletized empties, and at (E) to receive fulls. Fork trucks move empties to storage area (B) or palletizing area (C) as needed. Other trucks transfer pallet loads of filled cases from (C) to (D), or directly to delivery trucks at (E).

# Boosts Output, Deliveries, Sales the "Pallet Way"

## By mechanizing to reduce truck loading-unloading time, bottler gets higher performance in whole operation

IT WASN'T MERELY truck loading operations that were improved—time cut 80-plus percent—when Pepsi-Cola Bottling Co., Chicago, installed a fork truck-pallet system for handling cases of empty and filled bottles.

**In addition, delivery schedules were sharpened and sales rose, backed by new attainment of full output on the five bottling lines.**

**Also, raw material movements were sped, higher stacking raised storage capacity, bottle breakage was reduced, and sanitation was advanced.**

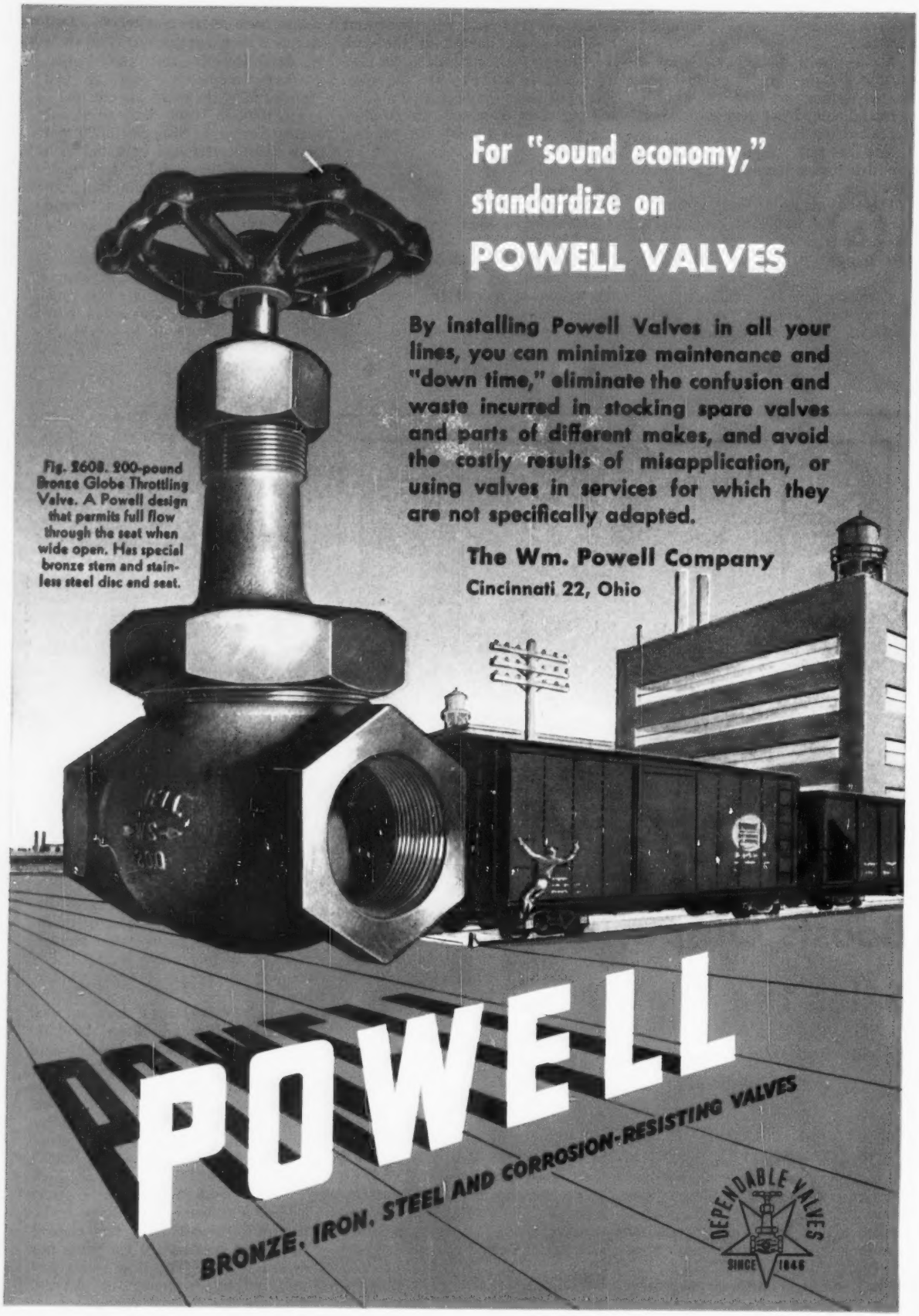
Under the old system, maximum bottling machine production was limited by ability to remove goods from the filling area by hand methods. Delivery trucks would check in about 5 A. M. and unload empty bottles. Then each driver would load his own truck by hand. This operation took as much as 3 hr. to complete, thus restricting loading to no more than 35 trucks per day. Filling machine output was bottlenecked by the loading capabilities.

The new system was tailored to load maximum attainable output of the bottling lines. Each of the five lines is capable of producing 300 cases per hour, a total of 3,000 cases. Palletizing into unit loads of 50 cases requires removal of 60 unit loads per hour. At the same time, an equal number of empty bottle unit loads must be supplied to the bottling machines.

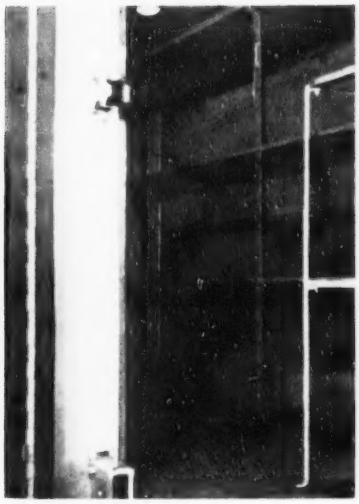
Modernization of the materials handling system was achieved through purchase of eight fork trucks with auxiliary equipment. Now, delivery trucks equipped with pallet bodies are relieved of empty cases by fork trucks working in the unloading area of the plant—(A) in drawing. Cases are taken directly to the empty-bottle storage area (B), or to bottling area (C), depending on needs of fillers at the time.

Delivery trucks then drive to area (E), where they are loaded by fork trucks. These trucks transfer unit loads from palletizing area (C) or storage area (D). During slack periods, they move unit loads into the storage area and also unload and transfer pallet loads of sugar, syrup, and other raw materials, from incoming freight cars to dry bulk storage area (F).

When a delivery truck is fully loaded, it follows the outlined traffic pattern to the exit. Now, total elapsed time from entrance to exit does not exceed 30 min. This time saving permits greater frequency of delivery calls—directly stimulating sales.


For "sound economy," standardize on
POWELL VALVES
By installing Powell Valves in all your lines, you can minimize maintenance and "down time," eliminate the confusion and waste incurred in stocking spare valves and parts of different makes, and avoid the costly results of misapplication, or using valves in services for which they are not specifically adapted.
The Wm. Powell Company
Cincinnati 22, Ohio
Fig. 2608. 200-pound Bronze Globe Throttling Valve. A Powell design that permits full flow through the seat when wide open. Has special bronze stem and stainless steel disc and seat.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846

**CURB** side of new Borden ice cream step-in drive truck. Note small loading-unloading door (left), 2-part folding door (seen open, center) to driver's compartment, and large walk-in door from cab to interior of body.



**INTERIOR** view of body showing shelves, center aisle, refrigeration plates, and dome light.

# Walk-In Truck Speeds Deliveries

New panel-type body mounted on step-in drive chassis provides greater capacity. Shelves, center aisle, and full-height door enable driver to quickly locate items in miscellaneous load

NECESSITY was again the mother of invention in the development, by Pioneer Ice Cream Div. of The Borden Co., of this revolutionary walk-in type ice cream route truck.

It has a refrigerated panel body with shelves that permit distribution of the various flavors of bulk and packaged ice cream, novelties, and specialties, thus greatly speeding loading and unloading.

The new body was created to surmount the inadequacies and check the increasing costliness of operation of the old 2- and 3-compartment type.

When it was desired to increase the load capacity of the former two-compartment body, companies had to add a third compartment and use a longer wheelbase chassis.

And then to further increase the capacity to accommodate long-mileage suburban routes, the vertical height and the length parallel with the longitudinal centerline of the truck had to be increased. (The compartment could not be widened because most state motor vehicle laws limit overall vehicle width to 8 ft.)

But each time the size of compartments was increased, it became more difficult to make deliveries. The driver had to crawl into the body on his hands and knees to reach those items stacked farthest from the doors.

This practice slowed down delivery. And with shorter work weeks and higher wages for route drivers, unit cost of delivery was increased. The problem was made even more difficult by addition of many new novelty and specialty items.

Necessity for inventing, devising, or adapting some new type of body was so apparent to Pioneer officials that a 3-man team comprised of Glenn Patterson, traffic manager, Carl A. Lawson, automotive superintendent, and A. Tomlinson, a route supervisor, was formed to investigate possibilities. After discussing the problem with route drivers, loaders, delivery superintendents, and route supervisors it seemed that some form of step-in drive chassis with a panel body having shelves and a center aisle would offer the greatest possibilities of success. Desired capacity was set at 1,200 gal.

**THOUGH ICE CREAM is the product handled here, this special truck design is seen applicable for streamlining distribution in any food field where variety of items has been complicating the efforts to maintain route delivery efficiency.—*The Editors***

## Scale Models Determine Layout

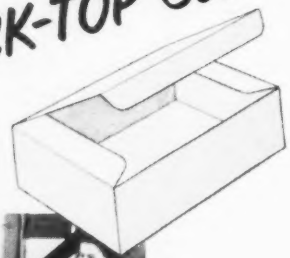
As the first step, Mr. Tomlinson built a scale model (4 in. to 1 ft.) of the proposed body. The roof was left off this miniature, however, to permit observance within of various aisle and shelf arrangements. Scale models were also made of the different packaged items. These were used to determine which of several body layouts seemed most suitable. Finally, a selection was made, and the first experimental body was designed. Details of the proper truck chassis were also worked out.

The body was built and mounted on the chosen chassis. Then the truck was transferred from one route to another, being assigned to given drivers to use for an entire week. Finally, all concerned agreed that the truck was practical—that it marked a great step forward in economical delivery of ice cream.

The truck was given one last test: It was put on a route for several months. After completion of this trial, the report came through that "it has

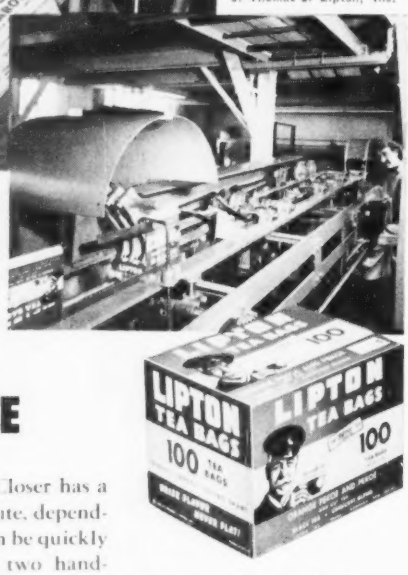
# Speeds up CLOSING of TUCK-TOP Cartons

PLAIN OR LINED



Model PC Carton Closer in plant of Grocery Store Products Co.

PC Carton Closer in plant of Thomas J. Lipton, Inc.




## QUICKLY ADJUSTABLE

Our modern Model PC Carton Closer has a speed of 34 to 102 cartons a minute, depending on the type of carton . . . It can be quickly adjusted for size of carton by two handwheels, and accommodates a wide range of sizes—3¼" to 12" in length, 1⅞" to 9⅞" in width, ¾" to 4½" in height for plain cartons (slightly smaller for lined cartons).

Legs of machine are easily adjusted for height, so machine can be hooked up with standard conveyors leading to packing table and wrapping machine.

Its advanced method of operation insures tight closures with liners neatly folded.

*Write our nearest office for complete information*

**PACKAGE MACHINERY COMPANY**
*CARTON DIVISION*
SPRINGFIELD, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS DENVER
LOS ANGELES SAN FRANCISCO SEATTLE VANCOUVER, WASH. TORONTO MEXICO, D.F.


no bugs in it." And so the decision was made to buy all future route trucks of the new design.

Body and chassis are complimentary—that is, one without the other would not give the complete design. This is because the walk-in door opens into the driver's compartment of the step-in drive chassis (see illustrations).

The new truck design follows that of the early Divco step-in drive retail milk route trucks and present-day milk and package delivery units.

### Body Detailed

The new body has two doors (one walk-in and one small), and two levels of shelves. Inside height is 5 ft. 8½ in. Center aisle has a width of 27 in.

The large door, located in the front, opens into the driver's compartment of the chassis. Through it the driver enters the body to assemble products for stop deliveries, and the night crew enters for loading at the plant.

The small door, 22 in. wide by 26 in. high, is located on the right or curb side of the body with its bottom edge 8 in. above the floor. It is used to remove the items at each stop and for loading at night when a roller conveyor is inserted through the opening.

The original body has a full height rear door which was intended for loading. But in practice it was found more convenient to use the small side door, hence the rear door was omitted in later models.

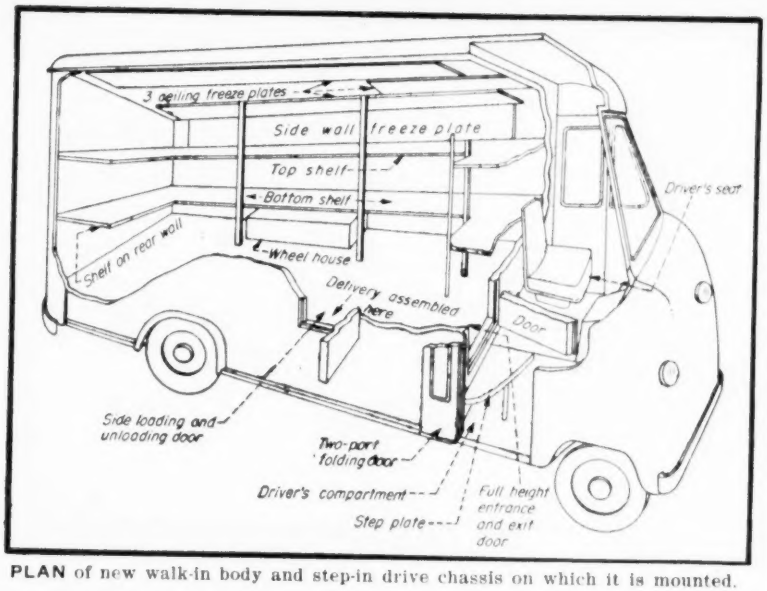
Two levels of shelves divide the vertical height into approximately three equal parts. Each row extends along both side and across the rear of the body. Front ends of shelves on the right side are cut off at the rear edge of the small door to provide floor space for assembly of items to be delivered, and to give access to the large door.

Shelves on the left side are carried across front end of body to the edge of large door. These shelves are made of openwork expanded metal to improve circulation of cold air.

Shelf area alone is sufficient to carry an average mixed route load consisting of bulk, packages, novelties and specialties which would fill an old-style 1,200-gal. body. Several hundred additional gallons can be carried in the aisle at the rear of the truck and still have all items readily accessible.

### Truck and Refrigeration

Chassis used is a Ford Model F-6 step-in drive, 134 in. wheelbase, with two extra leaves added to front springs, three to rear ones. First body was made by Franklin Body & Equip




**PLAN** of new walk-in body and step-in drive chassis on which it is mounted.

ment Co., Brooklyn, and the balance by the Amerio Refrigerating Equipment Co., Union City, N. J.

Cost of chassis was $2,085; of body $4,470. The latter was broken down as follows: $3,532 for body proper, $645 for freeze plates, and $293 for refrigerating units.

Chassis weighs 4,650 lb. and body 7,050 lb., to give a total of 11,700 lb. Tire sizes are: Front 7.50-20 8-ply, rear 8.25-20 10-ply dual.

Refrigeration and temperature-holding qualities have proved to be excellent. Interior temperature can be brought down to −20 deg., and after a full day's operation, it still remains below zero.

Refrigeration is produced by a 2-hp. Copelametic unit and five Dole freeze plates. The first named is carried below the body floor at the front left corner.

Two of the plates, each 120x 24 x ½ in., are suspended from the ceiling above the shelves; two others, each 120 x 30 x 1¼ in., are on the side walls; and the fifth plate, 54 x 18 x 1½ in., is located above the center aisle at the front of the truck.

Seven inches of ¾-lb. density Ultralite glass insulation is used in the roof, and 5 in. in the walls. Floor is insulated with 5 in. of Onazote.

The body is painted and lettered in an attractive new Borden layout. Roof is painted aluminum, upper panel white, lower panel yellow, and wheels black. The lettering consists of "Borden's Ice Cream," together with the head of Elsie, the Borden cow, at the center of a yellow daisy.

## Watch for Special Section in February

You will find something special in the February issue of FE. It will be a section devoted to significant new canning processes and methods.

This section also will contain a guide to exhibits at the canning show in Chicago. This guide not only will list all of the exhibitors, but it will show just where their booths are located on an exhibit floor plan.

Of importance to the entire food manufacturing industry, the canning section will carry several feature articles on new and basically important process developments. Among them will be these:

**Three New Short-Time High Temperature Processes**
**Tell-All Foldout Flowsheet of One Process, Plus Engineering Data**
**Automatic Control of Canning Processes**
**How Tomato Paste Is Concentrated to 36 Percent**
**New Canning Plant With Advanced Engineering Throughout**
**Comminution of Cooked Product To Improve Soup Quality**

February FE also will carry articles on advanced practices in other branches of the industry to give readers a well-balanced how-to diet.

KLENZADE

COMPLETE SANITATION PROGRAMS For All Food PROCESSING PLANTS

★ Tops for Tough Cleaning Jobs

Klenzade "CBS" Cleaner is the finest industrial detergent available. Superb balance and high wetting agent content provide excellent soil penetration, fat emulsification, and free rinsing.

★ High Temperature Cleaning

Klenzade Flash-Kleen is ideal for steam cleaning jobs. Strips "baked-on" soil residues quickly with the Klenzade Steam Cleaner.

★ Removing Mineral Films

Klenzade "Flash-Klenz" heavy duty organic acid detergent dissolves lime, "water-stone," and alkaline residues from canals, troughs, fillers, chutes. No abrasive needed — cuts labor costs.

★ Klenzade Alternate Cleaning System

Used the nation over. Klenzade Alkaline Detergents used alternately with Klenzade Organic Acid Detergents. Keeps all equipment sparkling and lime-free.

KLENZADE

"ALL OVER AMERICA"

KLENZADE FIELD SERVICE

A Klenzade field service technician will gladly call on you and help you plan a complete plant sanitation program.

KLENZADE PRODUCTS, INC.
Offices in Principal Cities
BELOIT, WISCONSIN

# keep TEFLON* in mind...

Teflon, duPont's new wonder plastic fabricated by the United States Gasket Company, is proving a better material for many food manufacturing requirements. Keep its unique properties in mind for such services as:

- Pump impellers that won't gall and freeze on such difficult solutions as vinegar, molasses, fruit juices, syrups, extracts.
- No-lubricant bearings that can't contaminate the product.
- No-lubricant pump and valve packing that imposes minimum torque on shafts and spindles.
- Teflon covered header rolls on bakers' dough sheeters that reduce or eliminate flour dusting; squeeze out more air.
- Teflon candy molds that eliminate the dust, mess and explosion hazard of starch molds.
- Sanitary, Teflon-covered working surfaces, conveyors, guide rails, trays, etc.—easy to clean and keep clean, bacteria resistant, non-absorbent, slippery to the stickiest substance.
- Non-contaminating, durable gaskets, expansion joints and accessories for glass and stainless steel piping.

Teflon—fabricated by the United States Gasket Company is available in sheets, tape, engineered packings, cut and molded gaskets, covered rolls, to solve many food processing problems. Ask for catalog or tell us your requirements.

UNITED STATES GASKET COMPANY

FLUOROCARBON PRODUCTS DIVISION

FABRICATORS OF "TEFLON", "KEL-F" AND OTHER FLUOROCARBON PLASTICS

CAMDEN 1, NEW JERSEY

*duPont's trademark for its tetrafluoroethylene resin.

## Output Up 50%

—Continued from page 127

electric hoist, is secured to a lifting bracket on one end of the truck. Next, the truck is raised off the carriage, an end gate with a small stainless sluice is opened, and the meat is then dumped through a chute and into a stuffer.

When a stuffer is ready for loading, the top is loosened and swung off to one side. A stainless steel shield is then mounted on the stuffer to fill a small gap between this unit and the bottom of the chute.

Red lights on a panel adjacent to the floor-level chutes in the third-floor preparation room flash when a stuffer is empty.

Finally, a circular overhead monorail permits free movement of smoke trees from stuffers, to smokehouses, to packing room, and back to stuffers. *End* (Resume reading on page 129)

## Bag-Borne Bacteria

—Continued from page 58

and shaking it against sides of bag.

Results are given in the accompanying tables. From Table I it can be seen that as far as the total numbers of bacteria are concerned the concentration in the bags is insufficient to contribute materially to the bacterial content of the sugar. Numbers in 5-lb. bags corresponded to less than two viable bacteria per gram of sugar. However, the significant point is whether these bacteria are uniformly distributed or concentrated in certain areas. It will be noted that on Sample 2 (Table II) there were six times as many bacteria per square inch of interior surface at the bottom of the bag as on the sides.

A test was made primarily for yeast and mold according to the methods used in the bottlers laboratories and in accordance with their specifications for sugars used in their field. Mycophil agar is used, and five days of incubation is required. Results are given in Table III. It will be noted that the mold fungi greatly predominated in the micro-flora of the interior of these bags.

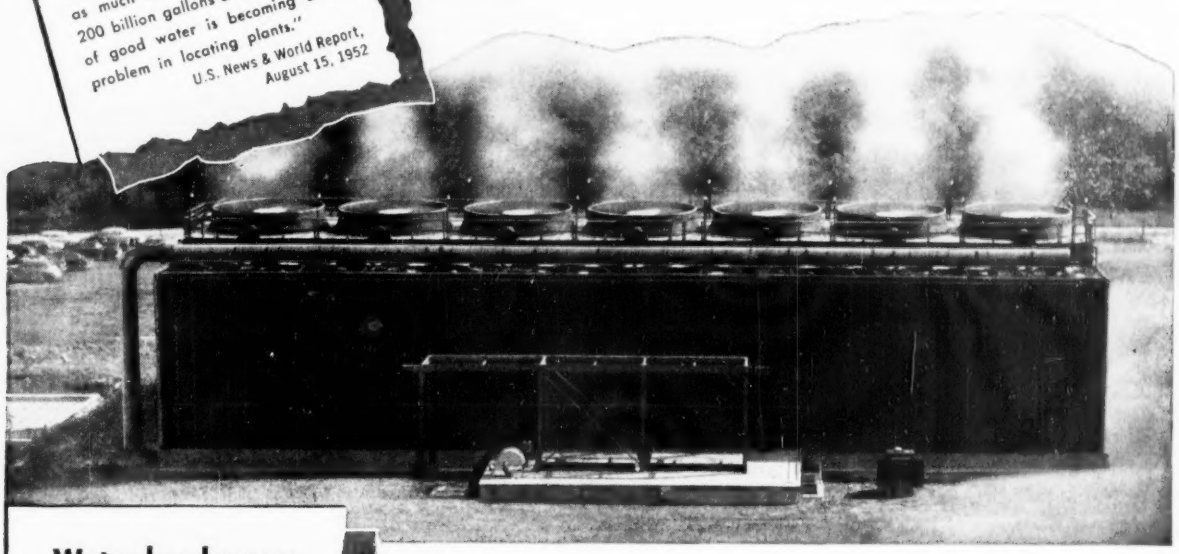
In another experiment, 2-in. sections were cut aseptically from various areas of the bags, and the sections were transferred to the surfaces of solidified mycophil agar, acidified with lactic acid to pH 4. Plates were then incubated for five days at a 34 deg. C. Counts are given in Table IV.

It is significant that both mold and

# this Marley Cooling Tower will be *twice as valuable tomorrow!*

**2½ times as much water in 1975...**

". . . And there's industrial water — water used by industries for cooling or washing, or as a material. Industry will be needing 2½ times as much in 1975 — something like 200 billion gallons a day. Shortage of good water is becoming a key problem in locating plants."
U.S. News & World Report, August 15, 1952



**Water has become a problem...**

"Even water, once regarded as a 'free commodity' of virtually unlimited supply, has become a problem. . . . The essence of the . . . problem is costs."
Fortune, August, 1952

**Industry will spend about $10 billion more...**

"The waste of our civilization threatens one of our vital resources: water. . . . It is estimated that . . . U.S. industries will probably have to spend about $10 billion more . . . " (to handle waste water in the next 20 years).
Scientific American, March, 1952

In 1975, according to reliable estimates, American industry will require 2½ times as much water as it does today. It follows that the ability of your present cooling equipment to conserve water will be of much greater value tomorrow when water is twice as scarce. Provided, of course, that the cooling towers you buy now are still operating in 1975.

If you buy Marley towers today, you are investing in this added value, for only Marley offers the rugged, service-proved structural features that assure such long-term, trouble-free performance. Marley provides today the design refinements that will still be modern in years to come—full height louver walls . . . open distribution . . . MortisLocked filling . . . mechanical equipment engineered exclusively for cooling tower service.

Many Marley towers have been in service for 25 years —and continue to deliver cold water day in, day out. That's why, no matter what your term of amortization, you will find a Marley cooling tower among your major assets long after it has been written off the books.

For a sound investment in the future of your company, buy your next tower from Marley, world's leading producer of water-cooling equipment.

MARLEY

**The Marley Company**

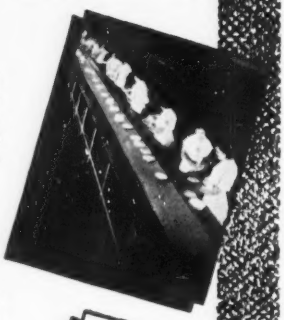
Offices in 50 Cities

**Kansas City 5, Missouri**

Where Can This
MOVING TABLE TOP OF STAINLESS STEEL
...increase YOUR processing efficiency?

Sandvik's Stainless Steel Belt Conveying Work Tables Are Minimizing Costs In Operations Such as Chicken Eviscerating • Bacon Slicing • Frankfurter Packing and Weighing • Hamburger Preparation • Tenderizing • Cake-icing • Cup-cake Icing and Packing • Ham-boning • Pork Rolling Fish Fileting • Vegetable Preparation Potato Chip Distribution, etc.

Here's a way to modernize food handling operations. Sandvik's standard work table units carry your product on a flat, endless band of stainless or carbon steel. Units can be adapted to virtually any application.



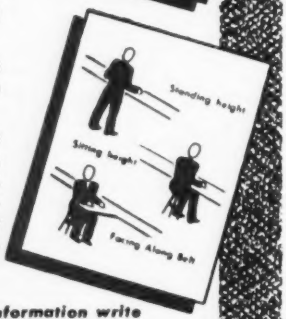
ADVANTAGES

EASY TO KEEP CLEAN—Live steam or boiling water can be applied directly.

NO TASTE CONTAMINATION—A smooth, impermeable surface . . . No place for food particles to lodge.

LONG SERVICE LIFE—Sandvik steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Lengths to meet any center distance. Standard work table widths are 20" and 12" but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available. SS-59




For complete information write
SANDVIK STEEL, INC.
Conveyor Department
111 Eighth Ave., New York 11, N. Y., WA. 9-7180
Manufacturers Of Steel-Belt Conveyors For Over 30 Years

SANDVIK STEEL BELT CONVEYORS

yeast were found on these sample bag sections, for although it is not surprising that the former should occur on this type of container, it is surprising that viable yeast should also be found there.

In the next experiment we attempted to appraise the viable microbiological content of paper bags used as refined sugar containers—by determining the increase in mold and yeast counts on sugars before and after bagging. This would, we thought, give an accurate index of the percentage of increase that could be attributed to the bag. The procedure was as follows:

One-pound bags of sugar from the production line of a refinery were sampled in the laboratory and plated out on mycophil agar, as previously described. Sugar was then transferred aseptically into new unused bags of the same capacity. After thoroughly mixing and shaking and kneading the freshly filled bags so as to detach from their sides and bottom as much of the adhering microbial contamination as possible, samples were taken from each bag and plated out on mycophil agar as before. Plates were then incubated five days.

Results are shown in Table V—and they are indeed significant. For not only did the bags contribute a definite increase to the mold count of the sugars, but in seven out of nine cases, the increases were sufficient to make the counts exceed the limits prescribed by the bottlers. Whereas on the original samples only two out of the nine samples exceeded the tolerable limits of mold, eight of the nine transferred samples surpassed it.

*End* *(Resume reading on page 59)*

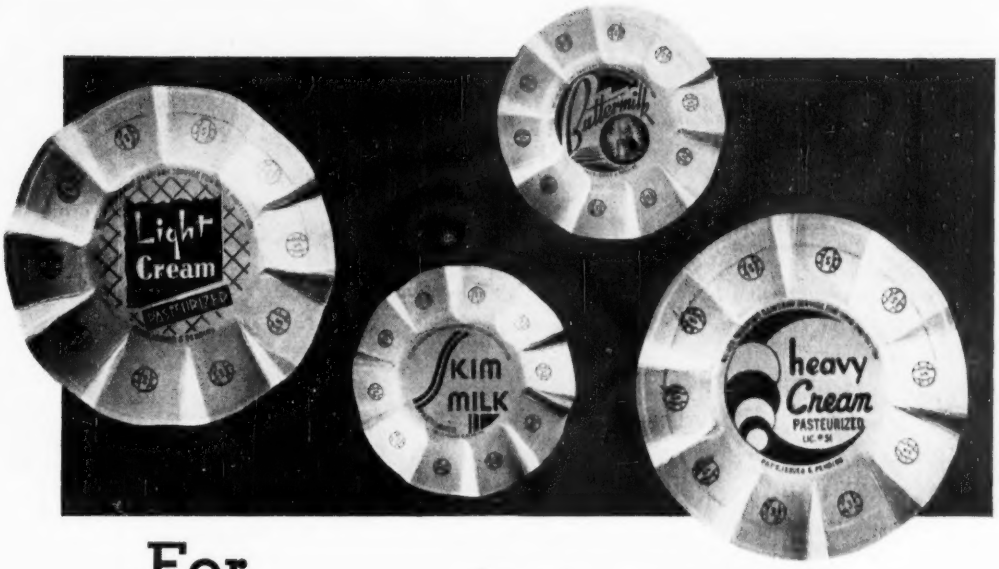
## Picking Proper Screens

*—Continued from page 79*

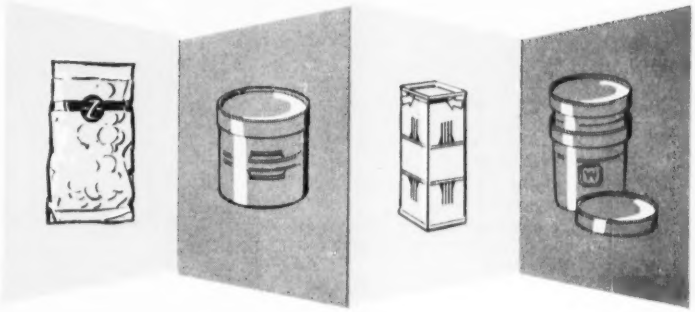
cal properties of the material being sifted and the expected service life of the screen. The aperture size is the basic factor that determines what will go through the screen.

An interesting thought comes to light when we consider what happens when it is desired to keep the aperture constant but increase the wire diameter in order to lengthen the screen life. First, of course, the mesh will decrease. But, more important than the mesh is the fact that the percentage of the total screen area that is occupied by wire will increase, resulting in less apertures per unit of area. This will reduce the capacity of the sifter.

The limits for the largest and smallest wire diameters practical in weaving a given mesh screen are determined




# For Perfect Product Protection!



## Specify Coatings of **VINYLITE** Brand Resins!

It's a big problem . . . keeping milk bottle closures *tightly sealed*, clean-looking, glossy, and protected against water.

It's the job for a coating of transparent VINYLITE Resins. They speedily heat-seal to a strong bond that keeps the crimped bottle closure tight, fitting the bottle snugly, withstanding the rough treatment of shipping and handling. Tough and flexible, they provide resistance to abrasion and moisture—won't crack or flake off at low temperatures.

Coatings of VINYLITE Resin are perfect for scores of similar packaging jobs. These clear, glossy coatings brighten and put a shine on labels—enhance colors and printing, improve surface texture.

What's more, they protect contents, too. Odorless and tasteless themselves, they keep odors out, flavor in. They are chemically inert. They can be used on paper, cardboard, metal and metal foil.

Many of their uses are covered in the "1953 Guide to Improved Packaging with BAKELITE and VINYLITE Plastics and Resins."

To get your copy, write Dept. OT-74.

Vinylite

BRAND

**RESINS**

TRADE MARK

*A Division of*
*Union Carbide and Carbon Corporation*
**30 East 42nd Street, New York 17, N. Y.**

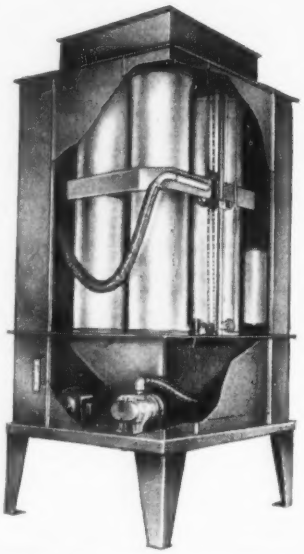


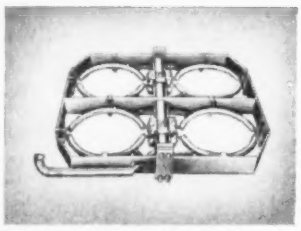
For more information, use coupon on last page.

# AEROTURN "ON THE JOB"

## 5 REASONS Why AEROTURN Can Do A Better Dust Collecting Job For You . . .

1. AUTOMATIC SELF-CLEANING OF FILTER prevents dust accumulation around filter elements. NO costly "downtime" for filter cleaning. NO costly manual cleaning.
2. 50% to 75% SAVING IN ERECTION TIME due to **AEROTURN'S** Unit Assembly Design. Precision manufactured, prefabricated sections readily assembled. All parts prime painted, boxed for shipment.
3. MINIMUM OF PLANT SPACE REQUIRED — uses only ⅓ to ½ the space required by other types of dust collectors of comparable capacity.
4. **AEROTURN** DUST COLLECTION "KNOW-HOW" built in to all AEROTURN Dust Collectors. *High efficiency and automatic self-cleaning design tested and proven in hundreds of installations.*
5. **AEROTURN'S** EXCLUSIVE BLOW RING CRADLE — a patented, fully automatic, self-adjusting, self-aligning blow ring assembly holds the rings snugly in contact with the wool felt filter bags at all times for maximum efficiency and filter bag service.





READ ABOUT "UNIT ASSEMBLY" DESIGN FOR EASY INSTALLATION

Licensed under Hersey Patent Rights. Other Patents Pending.

WRITE FOR THIS BOOK — SEE HOW THE AEROTURN DUST COLLECTOR CAN SOLVE YOUR PROBLEM.

NAME _____

COMPANY _____

STREET _____

CITY _____ ZONE ___ STATE _____ E

**TURNER & HAWS ENGINEERING CO., INC.**
**100 SIMBROCO ST. BOSTON 32, MASS.**


by screen manufacturers. A small diameter wire will, as shown, give a large percentage of open area with large sifting capacity per square foot of screen. This may be highly satisfactory for some applications but not for others.

### Aperture vs. Mesh

Because the definition of mesh does not include size of aperture, a definite aperture size has been assigned to every mesh number in each of the two standards previously mentioned.

For example, a No. 15 mesh silk screen compares with a No. 170 mesh in both the U. S. and Tyler Standards. In all of the specific screens listed in the table, the area column indicates the percentage of open area per unit of screen area.

The area percentage figure is directly proportional to screen capacity. However, whether a specific screen is the most economical to use for a particular product finally depends on physical and chemical properties of the product.

Even though the mesh numbers of actual screens differ from the U. S. and Tyler Standards, it can be noted in the table that the aperture sizes are fairly constant. These standards, then, serve a very practical purpose as a base from which actual screens may be determined.

### How to Substitute

Thus, the table is very helpful in determining what mesh substitutions can be made. For example, if it is required to increase the capacity of a sifter equipped with 24-mesh mill screen without changing product sizes, it can be done by using 28-mesh light wire screen. Use of the latter, changes the percentage of open area from 47.4 to 62.4, or an increase of 15 percent.

The result is a substantial increase in capacity, but there may be necessitated more frequent replacement of screens because the smaller wires in the 28-mesh light wire screen will wear and break faster than the larger diameter mill screen wire. On the other hand, if the screens are wearing out rapidly even though the capacity is low, it may be possible to use a screen having the same size apertures but using a larger diameter wire and lower mesh number.

Most screen and sifter manufacturers maintain their own laboratories to check the sifting of products. Check of a sample by these laboratories is usually sufficient to permit the manufacturer to recommend suitable equipment.

*End* *(Resume reading on page 80)*

# Votator
## HEAT-TRANSFER APPARATUS

## Speeds heating and cooling of strained foods

### WIDE APPLICATION

| FOOD PRODUCTS | FUNCTION OF VOTATOR APPARATUS |
|---|---|
| Cream Style Corn | Sterilizing and Cooling |
| Dog Food | Cooking, Sterilizing and Cooling |
| Chocolate Milk Drink | Sterilizing and Cooling |
| Edible Starch (For Salad Dressing) | Cooking and Cooling |
| Pie Filling | Cooking, Pasteurizing and Cooling |
| Strained Food | Sterilizing and Cooling |
| Soup | Sterilizing and Cooling |
| Lard | Chilling and Plasticizing |
| Margarine | Continuous Manufacture |
| Shortening | Chilling and Plasticizing |
| Sweetened Condensed Milk | Cooling and Crystallizing of Sugars |
| Invert Syrup | Cooling and Crystallizing of Sugars |
| Eggs | Pasteurizing and/or Chilling |
| Concentrates, Fruit Juices and Purees | Slush-Freezing |
| Juice Concentrates | Enzyme Inactivation, Sterilization, Cooling |

JUST PRIOR to canning at Gerber Products Company, strained baby foods are cooked and cooled . . . in a hurry. This operation is performed continuously . . . in a matter of seconds with VOTATOR* Heat-transfer Apparatus. This fast processing aids volume production at low cost.

Quality control also is facilitated. The food products are cooked and cooled in a closed system, thus oxidation or other contamination is impossible. Freshness and flavor are safeguarded at all times.

***Improves many Process Operations.*** Throughout the food processing field, VOTATOR Heat-transfer Apparatus is used for heating and cooling, sterilizing, plasticizing, emulsifying, crystallizing, quick-freezing and aerating. If you process any liquid or viscous materials, it will pay you to investigate. Call on Girdler for complete process engineering, design, and construction service as well as for efficient processing equipment. Write The Girdler Corporation, Votator Division, Louisville 1, Kentucky. West Coast Office: 2612 Russ Building, San Francisco 4, California.

*VOTATOR—T. M. Reg. U.S. Pat. Off.

# the GIRDLER Corporation
## VOTATOR DIVISION


For more information, use coupon on last page.

# NEW PACKAGES & PRODUCTS

## Raw-Water Blanched Peanuts in Consumer Pack

After intense experimentation and research, Seabrook Water Blanching Co., Inc., Tyrone, Pa., announces successful processing of raw water blanched peanuts with claims that it has eliminated the possibility of rancidity and infestation, long a serious problem in peanut blanching.

Using new methods and machines, fully covered by patents, company is now commercially processing product for consumer trade.

In the process, peanuts are blanched and sterilized in a hot water bath prior to removal of skins. This hot water bath is not sufficiently hot to rupture oil cells, but it is hot enough to kill all living organisms which may be on product. This fact is responsible for the exceptionally long shelf life of product.

Recent tests made by a leading outside laboratory compared the relative shelf life of these peanuts with that of regular dry blanched peanuts. It was found that after 14 days the dry blanched peanuts showed traces of rancidity. Reason given for this was that the oil cells were ruptured during heating, causing oil to come to the surface of peanut. After a 52 day test of Seabrook's product it was reported that no trace of rancidity showed up and they felt this was due to all of the vitamins and oil cells being held intact throughout blanching process.

Peanuts are automatically packed in 12- and 14-oz. size double wall cellophane bags, furnished by Milprint, Inc., Milwaukee.

For consumer consumption, instructions for preparation either by the oven or french frying method are given on the package. A recipe for peanut brittle, which is particularly recommended, is also given.

For Package Data Use Reader Service

## Coconut Filled Cookie

Similar in appearance to the well-known fig newton, a coconut filled cookie is now being offered by Zion Countryside Bakers, Zion, Ill. Processed in the company's modern plant, a coconut paste is extruded in rows around which a shell of dough is formed, then baked in a continuous band oven and cut to size.

These "Cocoanut Delites" are packaged in 14-oz. containers, approximately 24 to the carton. They are placed in two rows in an open-top chipboard box, then overwrapped with gaily printed cellophane. The open top allows for good product visibility, and appetizing appeal.

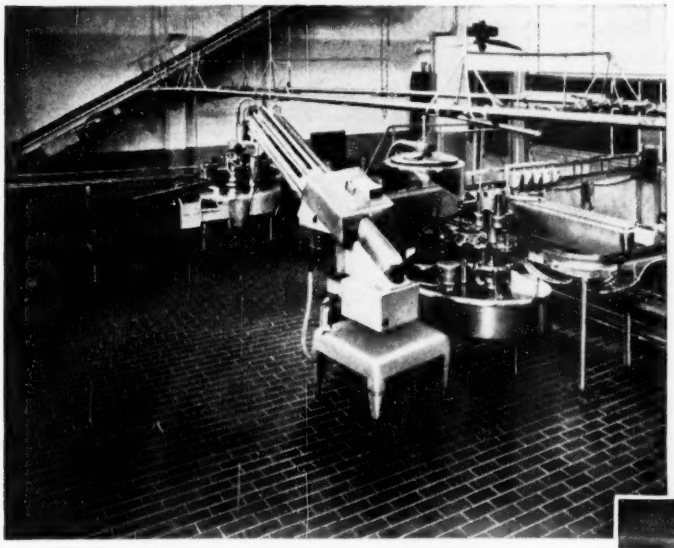
## "Snack Time" Specialties

Foods used for snacks and as a complement to cocktails continue to gain in favor. Processors of this type product are constantly looking for new and unusual items to offer.

Morton Foods, Dallas and Lubbock, Tex., has announced a new product called "Chili Corn Chips". Made of corn and flavored with chili powder, these have a tangy, peppery flavor, particularly popular in the Southwest. They are made by coating the regular corn chips with chili powder. After deep-frying, the chips are placed in a revolving pan, in 15-lb. batches. The chili powder is put into pan with chips, whereupon action of pan distributes powder through chips uniformly, the fat on surface of chips picking up powder particles.

The heat-sealed cellophane envelope (5 and 10c. sizes) has been attractively designed and produced by Milprint, Inc., Milwaukee. Through clear cellophane, the actual chips ap-

# DREHMANN INSTALLS SANI-BRICK FLOORS WHILE PLANTS RUN FULL BLAST



Problems like this are "old hat" for Dreh. ann. Again and again firms like General Baking, Great Atlantic and Pacific Tea Co., Borden Co. (to mention just a few) call upon us to make installations where neither production shut-down nor slow-down can be tolerated.

To accomplish this Drehmann has perfected a highly developed technique. First the problem is analyzed and plans drawn up. Then a skilled Drehmann crew moves in. While production rolls out as usual, these Drehmann workers lay Sani-Brick right over the present floor. They work around your men and machines, expertly and unobtrusively. Every detail of the job is smooth and efficient—the result of perfect organization.

Consider the many advantages of letting us install a heavy-duty, sparkling clean Sani-Brick floor in your plant now. It will pay for itself many times over in trouble-free service, low-cost maintenance and long life. Ask our nearest office to have a Drehmann Flooring Engineer give you the details.

## 9 POINTS OF SUPERIORITY

- Handsome Appearance
- Excellent Sanitary Properties
- Resistance to Acids and Alkalies
- Extreme Durability
- Faultless Drainage
- Easy to Clean
- Low Cost Maintenance
- Completely Vermin Free
- Long Life

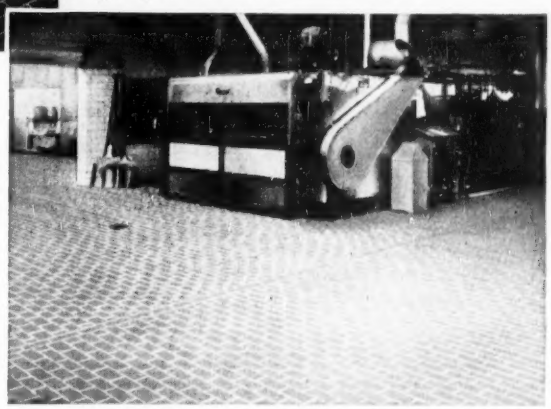
**DREHMANN PAVING AND FLOORING CO.**

*ORIGINATORS OF BRICK FLOORS* *ESTABLISHED 1869*

GAUL AND TIOGA STS., PHILADELPHIA 34, PA.
5737 S. HALSTED ST., CHICAGO 21, ILL.

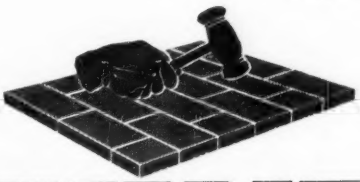
Remember, when planning new construction, solve the floor problem by instructing your architect to specify Drehmann.

*Write for Bulletin M-1 "Modernize Worn Floors Economically."*



*(Upper Left)*
Bottling Room, Abbotts Dairies, Inc., Atlantic City, N.J.

*(Above)*
Oven Area, Wagner Baking Corp., Newark, N. J.

DREHMANN HAS THE FLOOR  FOR MODERN INDUSTRY

# DREHMANN

## SANI-BRICK FLOORS



For more information, use coupon on last page.

# the ABC's of Flavor Perfection

by P&S

**A** **ALMOND - COCOANUT IMITATION**
A subtle blend of two old favorites, as succulent as the nut meat themselves.

**B** **BUTTER IMITATION**
Wherever a "rich, buttery" note is desired, here is the flavor for you. Easy to use and economical too.

**C** **CUSTARD IMITATION**
A delicate smooth flavor that makes pleasurable tasting.

**EACH flavor is available in heat stabilized form or in the proper base and in a concentration to meet your particular food product requirements whether it be:**
cake or cookie dough,
icing or cookie filler,
pudding, pie filler, candy . . .

***SEND for SAMPLE TODAY!***

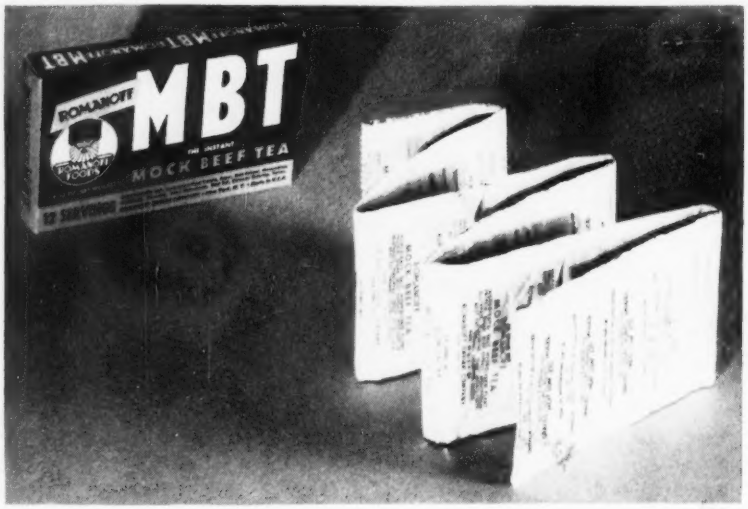
**GENTLEMEN:**
Please rush sample of
☐ A ☐ B ☐ C
Name
Address
City & State

**POLAK & SCHWARZ, INC.**
667 Washington St., New York 14, N. Y.
*Midwestern Office:*
173 W. Madison Street, Chicago 2, Ill.
*Representatives:* Milwaukee - Los Angeles
*Canadian Office:* Polak & Schwarz (Canada), Ltd.
914 Danforth Avenue, Toronto, Ontario, Canada


pear, as if they are really filling a bowl, which is part of design.

Another specialty item is salted sunflower seed, introduced by The Frito Co., Western Div., Los Angeles. It is packaged by All American Nut Co., Los Angeles, in heat-sealed cellophane bags designed, printed, and furnished by the South Gate, Calif., plant of Shellmar Products Corp.

For Package Data Use Reader Service




## Beef Tea in New Form

Romanoff Caviar Co., New York City, well known in the fancy food field, particularly as an importer of caviar for over 100 years, is now processing and packaging a new instant beef tea in powdered form.

Known as MBT, the product has a tangy, full bodied beef flavor, which is not salty to the taste, is low in calories and high in amino acids. Company stresses the fact that it is an instant beef tea and not a bouillon.

It also makes a delicious flavoring for gravies, soups, aspics, sauces, meat loaf and hors d'oeuvres. Ingredients include salt, hydrolyzed plant protein, sugar, beef extract, monosodium glutamate, flavoring, yeast hydrolysate, beef fat, caramel coloring and spices.

Powdered product is put up in attractively printed heat-sealed packets (4.5 g. each) made of acetate-foil laminated material. Linked in a strip of twelve, individual packets may be torn off as needed along perforations. Package material is printed and supplied by Milprint, Inc., Milwaukee.

Six ounce economy jars, 16-oz. institutional jars, and 100-packet fountain dispenser packs are also available. All cartons and jars carry the familiar Romanoff red-and-black color design.

Distribution of product is being handled by Kraft Foods Co., Chicago, which has added this to its portion-control line that already includes prepared and packaged jellies, marmalade, and cranberry sauce (FE, April '52, p. 146). At present distribution is limited to the East Coast.

For Package Data Use Reader Service

## Sherbet Pack Attracts

To help stimulate sales, Adams Dairy Farms, Blue Springs, Mo., is packaging its line of sherbets in a colorful cellophane overwrap, designed and printed by The Dobeckmun Co., Cleveland. Design was engineered primarily for distribution via supermarket freezers.

New package is overwrapped with moistureproof, colorfully printed cellophane. Four different colors—orange, lime green, raspberry, and yellow—are used in attractive candy-stripe design. The colors not only attract the eye but make it easier for consumer to pick out the particular flavor desired.

For Package Data Use Reader Service

### Frozen Cherries

Under its "Sunshine" label, Sunshine Packing Corp. of Pennsylvania, North East, Pa., is marketing quick-frozen, pitted, red tart cherries. The fruit is prepared, mixed with sugar, and quick frozen in 10½ oz. cans, furnished by The American Can Co., New York City.

Recommended uses are as fillings for tarts, pies, puddings, or as a sauce for shortcakes, ice cream, jellied desserts, and sponge cakes. The cherries may also be combined with other fruits and served in fruit cups.

**For Package Data Use Reader Service**

### Variety of Frozen Foods

Polar Foods, Inc., subsidiary of Cedergreen Frozen Pack Corp., Bellingham, Wash., continues to add variety to its present line of frozen food products. Among those now being distributed are six frozen fish items, frozen waffles, blueberry muf-

an idea stimulator!

"Pack to Attract!"

Portfolio of merchandising ideas FREE!

you'll use it everyday. Shows how to make your package a dramatic salesman . . . how to put your customers in a buying mood . . . how to demonstrate product features . . . *how to sell more merchandise—faster.* An impressive gallery of photographs will help you *visualize countless ideas* to streamline your packaging program, cut costs, and improve efficiency. Get "Pack To Attract" for your reference library. Write Hinde & Dauch, 5315-A Decatur St., Sandusky, Ohio.

H&D

Our 65th Year

HINDE & DAUCH

40 SALES OFFICES • 17 MILLS AND FACTORIES




For more information, use coupon on last page.

# Wanta pump something at lower cost?

## CHECK HERE

Air
Alcohol
Ammonia
Beer
Benzol
Boiler Feed Water
Brewer's Mash
Butter
Butane
Cane Syrup
Calcium Carbonate Slurry
Calcium Sulfate Slurry
Casein Solutions
Cement Slurry
Chocolate
$CO_2$ Gas
Crude Oil
Dairy Products
Dye Solutions
Edible Oils
Ethane
Fish Oils
Formaldehyde
Fresh Water
Gas, Manufactured
Gas, Natural
Gasoline
Glucose
Glue
Glycerine
Glycols
Hydrochloric Acid
Hydrofluoric Acid
Ink
Jam
Jelly
Ketchup
Lacquer
Latex
Mash
Methane
Milk
Molasses
Naptha
Nitric Acid
Nitrogen
Oil, Crude
Oil, Refined
Oxygen
Paint
Potassium Hydroxide
Propane
Raw Boiler Feed Water
River Water—Dredging Operations
Rosin
Salt Water
Shortening
Sludge
Soap
Sodium Chloride Solution
Sodium Silicate
Sodium Sulfate Solution
Starch
Sulphuric Acid
Sump Water
Sweet Water
Tomato Juice
Varnish
Vinegar
Viscose
Water (various)
Wax
Whey

THIS list of fluids will give you a rough idea of the diversity of pumping jobs in which Darcova Pumcups are responsible for really *big* savings.

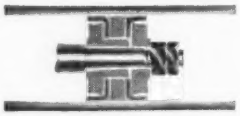
It boils down to the fact that Pumcups all but eliminate fluid slippage *throughout* their life span . . . and they *last many times as long as other packings*. Think of the down-time avoided, the production gains due to prolonged high efficiency, and the time-and-money-saving reduction in maintenance!

Years of application research have gone into the development of Pumcups. Made today in standard as well as many special compositions and textures for a wide range of temperature and pressure conditions, they offer you superior cost-cutting service in virtually *any* pumping job, simple or tough! And they're available in diameters from 1 to 20 inches.

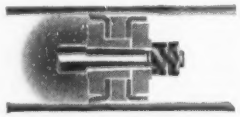
### SEND FOR FREE BULLETIN

Why not weigh *all* the facts? Bulletin 4401 covers Darcova Pumcups for reciprocating pumps; Bulletin 4502 on Pumcups for air or hydraulic mechanisms. Write for yours today.

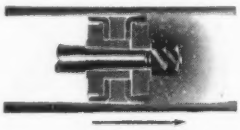
DIAGRAM OF DARCOVA PUMCUP ACTION (greatly exaggerated)



NORMAL: BOTH PUMCUPS RELAXED



UNDER PRESSURE: PUMCUPS SEAL AGAINST CYLINDER DESPITE WEAR, MINIMIZING SLIPPAGE



**DARLING VALVE & MANUFACTURING CO.**
WILLIAMSPORT 20, PA.

DARCOVA
THE ORIGINAL COMPOSITION CUP
PUMCUPS

fins, baking powder biscuits, beef and cube steaks, strawberries, and peaches.

The fish products are halibut, sole, cod, ling cod, flounder, and ocean perch, all custom-packed in Canada for the company.

Cartons for fish and bakery items are packed in chipboard boxes, overwrapped with waxed paper. Steaks are packaged in cellophane envelopes, and peaches and strawberries in metal-end cartons. All cartons carry the trade-name in blue, the product name in red, and a reproduction of the cartons' contents in natural colors.

## Dietetic Dessert

A ready-to-eat fruited dessert with less than two calories per teaspoon is being offered by Orchard Products Co., Chicago, under its "Orchard Maid" trademark.

It is particularly recommended for diabetics and those on a reducing or low calorie diet. It can be eaten direct from jar or used as a spread like any preserve. At present it is available in strawberry, grape, and seedless red raspberry. The company expects to add other flavors in the future.

Product is packed in 8 oz. jars manufactured by Owens-Illinois Glass Co., Toledo, with closures by White Cap Co., and labels by Frank C. Shuman Co., both of Chicago.

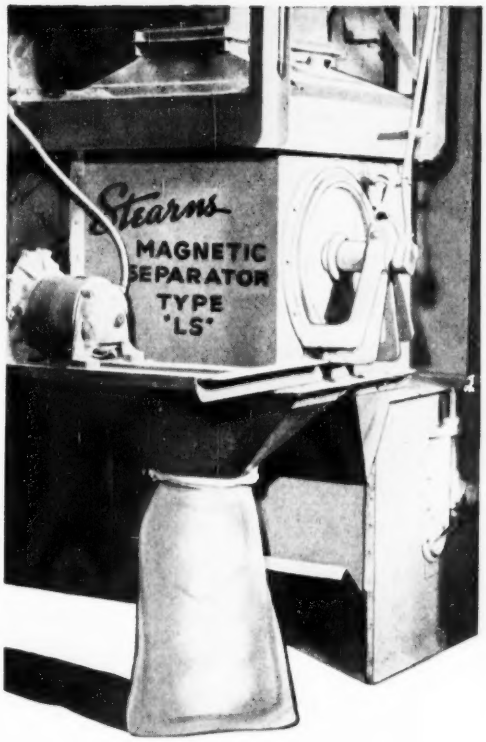
For Package Data Use Reader Service

## Prepackaging Produce

Fast becoming standard procedure is the prepackaging of produce, as well as of meats, frozen foods, candy and other grocery items. For that reason much thought and experimentation is given to attain the most suitable type of package for necessary protection, eye appeal, filling and handling ease, and adaptability to good display.

A very important part of this type package is the closure. At top is shown a vinyl plastic-covered wire developed by Pas-Ties Co., Santa Ana, Calif. Company claims that these strips, which range in size from 4 to 16 in., make an airtight closure with a mere twist of the fingers. It is said to be moisture proof, fadeproof, dirt resistant, and suitable for re-use. Ties are available in a variety of colors, including two-color combinations.

For its "Cal-Gems" carrots, Zarling Pre-Pack, Watsonville, Calif., is using polyethylene bags (lower photo) which are furnished by Milprint, Inc., Mil-


FORGET TRAMP IRON

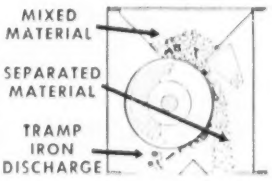
WHEN YOU INSTALL

Stearns MAGNETIC SEPARATORS

cut processing costs this sure way!

● *That's right* — forget tramp iron by installing a STEARNS Magnetic Separator. Eliminate all tramp iron dependably, automatically just as this mid-western soybean processor is doing. Installed between a screw conveyor and the intake of a bucket elevator, this STEARNS Type "LS" removes all tramp iron from the feed concentrates before going into the pellet machines. RESULTS? The product is purified and the pellet machines are protected.

● *For your separation problem . . .* Whether you are processing soybeans, feed, grain, flour or some other product, a STEARNS Magnetic Separator is your best bet to purify your product and protect expensive pulverizers and grinders. Avoid shutdowns and costly repairs — remove all tramp iron with STEARNS electro and permanent magnetic separators. Note how tramp iron is separated and discharged automatically.




A SEPARATOR FOR EVERY NEED

Electro and permanent magnetic separators, pulleys, filters, plate magnets, spouts and drums — all EXPERIENCE ENGINEERED to meet your requirements.

Type "LS" (left) and Type "LP" (right) are particularly designed for dust-tight applications and are built as a complete unit for direct attachment to spouts and chutes. Electro and permanent magnetic models available in all sizes. Write for descriptive literature.

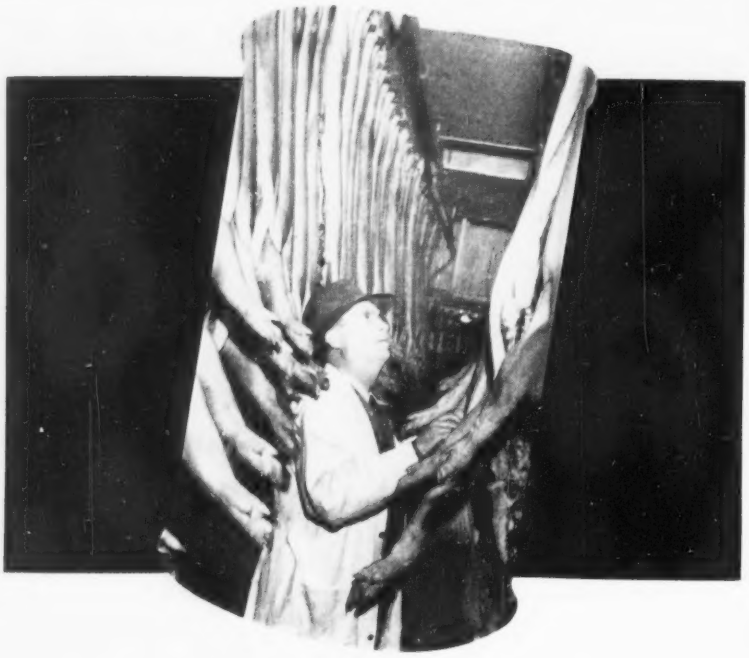
8552C

*Foremost in the Magnetic Field*

Stearns MAGNETIC INC.

667 South 28th Street, Milwaukee 46, Wis.

# MISSISSIPPI . . . First Again!



## . . . with a New Livestock and Poultry Production Plan

Excellent opportunities exist today for processors of livestock and poultry products in Mississippi, which has just scored another first in the field of agriculture. To encourage the rapidly growing livestock and poultry industry, the Mississippi legislature recently adopted an act and set up a guaranty fund to encourage banks and other lending agencies to make long term livestock and poultry production loans to qualified farmers of the state.

Mississippi is now first in livestock production among the Southeastern states with 1,791,000 head of cattle on farms. She ranks second in poultry, having increased production six times in the past five years.

In addition to these available resources, Mississippi's BAWI law—another first—permits communities to vote bonds to provide sites and construct buildings to house processing industries.

With raw materials and a plant within your reach in a growing new market, you can't afford to overlook the opportunities offered under these two programs. Get the details today. Write:

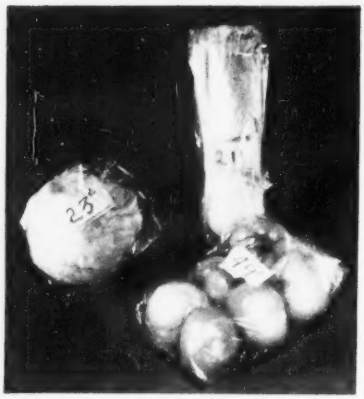
MISSISSIPPI

MISSISSIPPI AGRICULTURAL

The BAWI State

AND INDUSTRIAL BOARD

State Office Building
Jackson, Mississippi

waukee. Company has developed an operation for prepackaging 50,000 units of carrots a day after carefully grading, sizing, and washing them. And it wanted to present this product in an attractive package that would display it to best advantage. In upper photo is shown the bag finally selected. Design features brand name in red, while dark green and white are used for copy and leaf-like package top.

Another problem in prepacking of produce has been that of price-marking. Dobeckmun Co., Cleveland, after considerable research, has introduced a new line of cellophane produce bags, in a variety of sizes. These have a printed panel for legible price and weight marking on front. Special inks with which panels are printed permit marking to be made with ordinary lead or grease pencils, or rubber stamps. Bags, called "Price-Markers", are manufactured from moistureproof and water repellent cellophane.

For Package Data Use Reader Service

—*End*—

## Product Pumping

—*Continued from page 98*

slab beneath the tank. Total length of pipe under the tank is approximately 1,062 ft. for a heat exchange area of 618 sq. ft. Antifreeze was added to prevent the water freezing at times when the system was not in use due to the tank being empty.

Balance of the heating system was comprised of a Kewanee C. I. oil-fired boiler (rated at 528,000 Btu. per hr.), a circulating pump, expansion tank, and valves.

Automatic controllers were employed to regulate the pre-set temperatures of the boiler water and the return water. Operation is managed by observation of the liquid sugar temperature in the tank, using a recording

# 4 reasons four food plants chose WEAR-EVER aluminum equipment

## Sanitary

**Pfaelzer Bros.,** Chicago, wholesalers of choice meats, uses Wear-Ever Aluminum drums because of their sanitary construction. They have open heads, seamless walls and continuous, crevice-closing welds; meet every sanitary code. Available with dollies and covers.

## Durable

**Schaaf Sausage Co.,** Milwaukee, has invested in Wear-Ever Aluminum kettles because they last so long, and cook so well. Wear-Ever equipment is made of an extra hard, dent-resisting alloy that gives years of extra service.

## Light to handle

**Wagner Baking Corp.,** Newark, N. J., finds that Wear-Ever Aluminum tubs are tops with its employees because aluminum is light. This quality also enables Wear-Ever equipment to be made with strong, extra thick walls and still remain easy to handle.

## Easy-to-clean

**Liberty Baking Co.,** Pittsburgh, likes Wear-Ever Aluminum trucks because they're easy to clean and keep clean. Aluminum won't splinter, rust or chip. It is friendly to foods and cannot affect taste or flavor.

**WEAR-EVER** *Aluminum*

Standard of Quality — for more than 50 years

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

*For the entire story about Wear-Ever Aluminum equipment, mail the coupon today.*

The Aluminum Cooking Utensil Company
301 Wear-Ever Bldg., New Kensington, Pa.

- ☐ Send me your new catalog of your entire line.
- ☐ Send me your book entitled, "Facts Worth Knowing About Wear-Ever Aluminum."

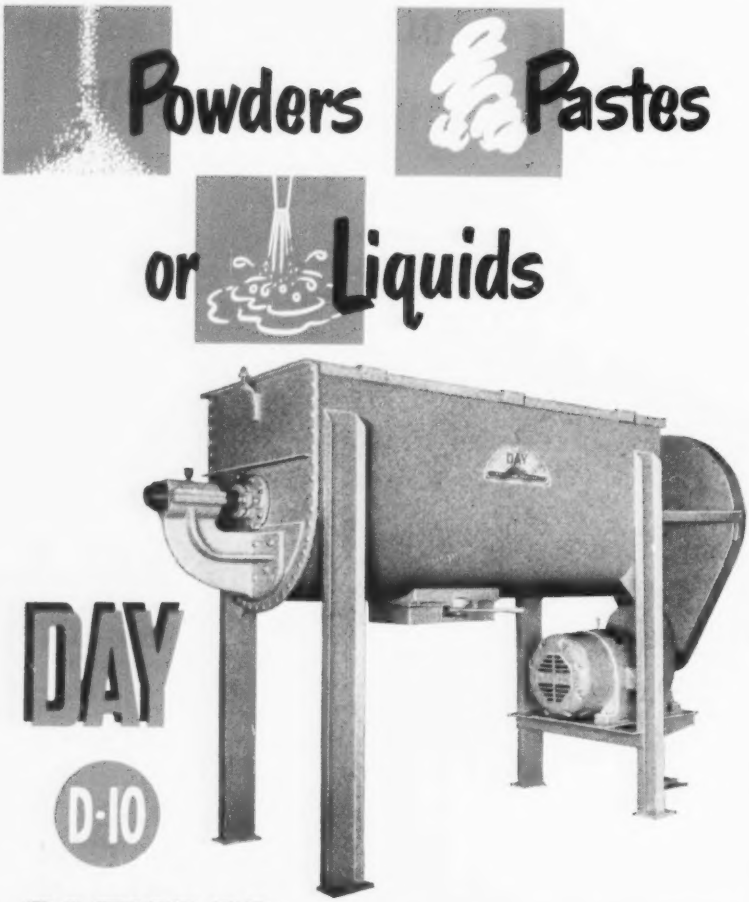
NAME . . . . . .

TITLE . . . . . .

Fill in, clip to your letterhead and mail today



For more information, use coupon on last page.




**Whether you work with powders, pastes or liquids, you can depend on a DAY D-10 BLENDER to boost production. Scientifically designed agitators insure constant, thorough blending action. Sturdy outboard bearings provide ample support for the agitator shaft, remain free from abrasive action by the material being mixed and also eliminate bearing loads on the stuffing boxes. Heavy-duty design includes a rigid frame that is free from vibration, plain or stainless steel tank and a geared head motor with roller chain drive. Discharge at center or either end is optional. Available with Spiral Ribbon Agitator for paste, semi-paste, granular or liquid products.**

DRY COLOR AGITATOR

Optional, supplied when necessary for materials such as heavy-bodied powders.

*Call* your J. H. Day Sales Engineer or write for details. The J. H. Day Co., Inc., 1146 Harrison Ave., Cincinnati 22, Ohio.

THE J. H. DAY COMPANY, CINCINNATI 22, OHIO
INCORPORATED • FOUNDED 1887


thermometer mounted in the boiler room. Boiler water temperature and return water temperature are set to accomplish the desired heating.

The accompanying graph shows the relationship of mean outside temperature, fuel oil consumption, liquid sugar temperature, and boiler water temperature for the period from Nov. 10, 1949, when heating began, to Jan. 10, 1950.

Boiler water temperature was to have been held at 140 deg. F., and it was expected that about a week would pass before much effect on the liquid temperature would be shown. However, on Nov. 14, the boiler water temperature was raised, through error, to 190 deg. F. It will be noted on the graph that the increase of 50 deg. F. caused the fuel use to double.

On Nov. 30, this condition was corrected and a temperature of 140 deg. F. was resumed. The slow rise in temperature of the tank contents continued until Dec. 9, when it reached 75 deg. F., with a mean daily outside temperature of 24 deg. F. This was nine days after the reduction in boiler temperature. Tank temperature was affected almost immediately by outside temperature, whereas the lag between tank temperature and boiler water temperature was from five to nine days.

*End* (*Resume reading on page 99*)

## Hearth Baking

—*Continued from page 92*

uniform bake and maximum flavor. Temperature of the oven (425 deg. F.) is thermostatically controlled.

Baked loaves are now automatically unloaded from the oven onto a stainless slat-type conveyor, which discharges them from the side of the oven and onto a rotary sorting table. Here, the metal frames are removed, and the loaves are loaded onto an inclined flight conveyor with metal spacing fingers. The loaves then travel through a company-built continuous cooler that employs two 200-ft. wire-mesh belts.

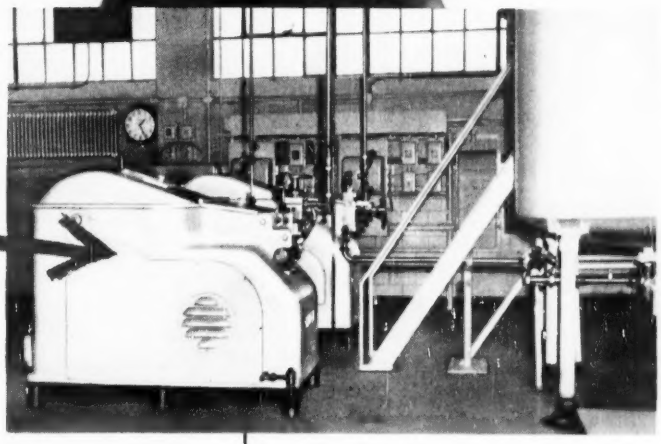
Installation of the continuous overhead cooler was another efficiency move. It eliminates the need of cooling racks, thus providing more space for other operations.

Finally, the cooled loaves are fed to an AMF slicer-wrapper. Here, the bread is automatically sliced and separated into three 1-lb. stacks that are then machine-wrapped and sealed with waxed paper. Heels from each loaf are discarded and sold for animal feed.

*End* (*Resume reading on page 93*)

# Tastes Better Here

## because it's emulsified here ...with a GAULIN HOMOGENIZER



**TYPICAL PEPSI COLA installation** in Brooklyn, N. Y. showing 1500 and 1000 GPH Gaulin Homogenizers used in making Pepsi Cola concentrate. Gaulins are used in Pepsi Cola plants all over the world.

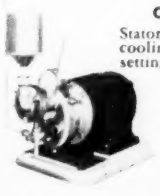
Experience with hundreds of beverages proves a Gaulin Homogenizer breaks concentrate particles smaller . . . disperses flavoring oils evenly. Accents flavor . . . stops separation. And makes a finer, perfectly uniform emulsion or dispersion.

Operators report Gaulin Homogenizers are a FASTER, MORE ECONOMICAL way to make uniform emulsions and dispersions, too.

Why not investigate for your product, today. Complete testing facilities and recommendations are yours — without charge or obligation.

**GAULIN PILOT PLANT HOMOGENIZER**

Ideal for experimental purposes, operation or process requiring up to 25 gallons per hour capacity. Handles quantities as small as one pint. Available on low rental basis.



**GAULIN TWO-STAGE COLLOID MILL**

Stator is jacketed for cooling or heating. Gap setting adjustable for .001" to .045". Only 45 seconds clean-up required in changing colors. 12" head room. 12" x 17" floor area.

Gaulin TRADE MARK

**Manton Gaulin**
MANUFACTURING COMPANY, INC.
63 GARDEN STREET
EVERETT, MASSACHUSETTS



For more information, use coupon on last page.

# The Vital Story of RICE ENRICHMENT

*by* Science Writer

The story of rice enrichment begins in the Philippines in 1910. In that year and place, Dr. R. R. Williams encountered the clue that started him on the road to the first successful synthesis of thiamine (vitamin $B_1$) in 1936. It was the curative effect against beriberi of an extract of rice polishings.

The problem of beriberi, while not serious in the United States, is recognized as severe, with high mortality, in the Philippines and other Asiatic countries where the population exists principally on white rice.

It is known that beriberi is caused by dietary deficiency and that factors in those parts of the rice which are removed in the milling are effective in combating the disease.

If rice could be milled to the whiteness desired by rice eaters and, at the same time, be made to contain the anti-beriberi factor, a giant stride could be taken to improve the health of rice-eaters. The use of white rice by these peoples, coupled with illness and death from beriberi, poses a problem for public health officials.

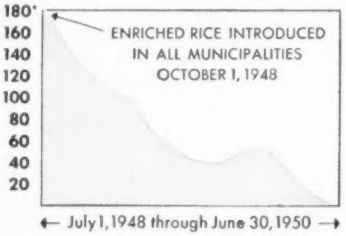
The answer to this problem was found in the laboratories of Hoffmann-La Roche. The researchers discovered a process by which white rice could be fortified. The method employs coatings of thiamine, niacin, and iron on rice grains and a final, outer coating of edible material to protect the vitamins against deterioration and preliminary washing and rinsing. For economy, large amounts of vitamins are applied to small amounts of rice to make a "premix." One pound of this enrichment premix is then mixed with each 199 lbs. of ordinary milled white rice at the rice mill. Each 8 ounces of this nutritionally-improved rice provide 1 mg. of thiamine, 8 mg. of niacin and 6.5 mg. of iron. These levels are commonly used but higher levels are easily obtainable.

A research project was established to study the effect on health of feeding white rice so enriched to a *population* in the Far East. Through the cooperation of the Government of the Philippines, the U. S. Public Health Service, the Williams-Waterman Fund, the Philippine National Rice and Corn Corporation, and Hoffmann-La Roche, a controlled experiment on the Bataan peninsula was set up. Medical examinations, under the direction of Dr. Juan Salcedo, now Secretary of Health for the Philippine Republic, were made of more than 12,000 people in the area before the enrichment of rice began. Nearly 13% had beriberi but most were symptom free a year later.

Enriched white rice was put into commerce in the experimental area, after full publicity about the program, on October 1, 1948. Careful monthly records were kept of the mortality from beriberi in the experimental and control areas.

***The results of the test proved overwhelmingly the value of enriched white rice.***

**At the end of 2 years, with over 90,000 persons under this great nutritional test, the beriberi mortality rate per 100,000 population had dropped from approximately 190 in the experimental area to zero! And, from the evidence of the medical examinations, it was found that almost 90% of those who had displayed beriberi symptoms earlier were now free of them or greatly improved. Literally thousands of people were helped to better health.**




**The vital story of the Bataan experiment shows once again the value of enrichment to *entire peoples*. The moral is obvious: when good foods are made better, everyone benefits.**

**Published in the interests of better health through better nutrition by the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. Reprints of this article are available on request, without charge.**

# ADVANCES IN TECHNOLOGY

## Consumers Prefer Cakes Made With Butter, Bread Made With Low-Extraction Flour

Ability to distinguish baked goods made with butter or oleomargarine, fresh eggs or reconstituted dried eggs, and long extraction or short extraction flour, was tested on a small group of tasters (60) and a large group of consumers (2000).

Participants were not told the reason for tests nor given any of the results during the test period. Over 2,000 tastings were made from early fall to late spring of the following year.

Samples submitted were plain cake (Madeira cake), layer cake, short bread, and yeast-raised bread. It was difficult to distinguish between Madeira cakes made with butter or oleomargarine, fresh or dried eggs. Layer cakes made with 72 percent extraction flour were distinguished from others made with 85 percent flour at a significant level. Short breads made with 26.8 percent fat as butter were readily distinguished from others made with oleomargarine or compound fat as shortenings.

Bread and short bread were rated in consumer tests for preference. Breads made with 72, 80, 82½, and 85 percent extraction flours milled from the same wheat were scored from 1 to 4 for preference and appearance. Taste scores for breads made from 72 and 80 percent flours were not significantly different, but both 82½ and 85 breads were rated significantly lower than the first two. In appearance order of preference was significantly 72, 80, 82½, 85, bread made with 72 percent flour having the best appearance. Short breads were preferred in the order of butter, compound fat, oleomargarine.

Digest from "Some Organoleptic Studies on Bakery Products," by J. B. M. Coppock, J. H. Tulse, J. P. Todd and A. Urie, *Journal of the Science of Food & Agriculture*, Vol. 3, No. 10, 433-41, Oct. 1952.

MEATS

### Quality of Frozen Pork Depends on Wrappers

With proper wrapping, frozen pork can be stored for a year at 0 F. and still retain identity as a fresh product. With improper wrapping, however, an undesirable flavor develops in the fat which ultimately penetrates the lean meat.

Loins from carcasses that had been cooled for 24 hr. following slaughter were cut into chops and wrapped individually in one of the following types of paper: Cellophane-lined; waxed locker, and unwaxed, then frozen and stored at 0 F. At monthly intervals for 14 months chops were removed, thawed for 22 hr. at 40 F., roasted until their interiors reached 185 F. They were judged for: Loss of weight; intensity and desirability of aroma; flavor of fat and lean, texture, and tenderness.

Loss of weight was greatest in chops wrapped in unwaxed, and least in those in cellophane-lined paper. These losses tended to balance each other on cooking, however.

Chops wrapped in unwaxed paper developed more intense aroma, and fat was less desirable than those in other wraps. Off-flavors were noted by some judges at the end of 2 months, but were not considered objectionable until 8 months or more. Tenderness remained similar to that of fresh pork.

Digest from "Chemical Constituents, Physical Properties and Palatability of Frozen Pork," by A. O. Mackey, A. W. Oliver, and S. C. Fang, *Food Research*, 409-17, Sept.-Oct. 1952.

### Gelatin From Collagen

Conversion of collagen into gelatin by heating in water cannot yet be fully explained, though the effects of different treating methods are known.

Soaking collagens from different sources (pig skin, rabbit skin, ox sinew, ossein) in HCl or lime water increases gel strength and alters isoelectric points of the gelatins, in the direction of acidity for alkali treated, and alkaline for acid treated collagens.

Acid-process gelatin had a nitrogen content of 18.52 percent compared to 18.49 for water extraction and 18.08 for alkali-process. Differences are believed to be due to differences in structure of the gelatins.

In acid process gelatins, bonds in the collagen chain susceptible to acid attack are broken; in the alkali process product those susceptible to alkali are severed. This explains why heating alkali-process gelatin in acid (or acid-process in alkali) severely affects its viscosity and causes loss in gel strength. It is therefore not possible to make alkali-type gelatin by acid treatment. Better gelatin is obtained by giving alkali-treated material (lime-treated skins) an alkaline extraction.

Ossein obtained from bones by action of acids should be heated in acid solution to get best gelatin from it.

Digest from "The Conversion of Collagen to Gelatin and Their Molecular Structures," by W. M. Ames, *Journal of the Science of Food & Agriculture*, 454-63, Oct. 1952.

PACKAGING

### Color and Flavor Findings On Kraut in Film Bags

Packaging of sauerkraut in flexible film is satisfactory only when oxygen in removed, certain metal contamination is avoided, and exposure to fluorescent light is prevented.

These findings resulted from an investigation of certain aspects of discoloration and undesirable flavors resulting from packing kraut in pliofilm.

Unprocessed kraut and juice were

INDEX TO ABSTRACTS


BAKING
Consumers Prefer Cakes Made With Butter ... 149

MEATS
Quality of Frozen Pork ... 149
Gelatin From Collagen ... 149

PACKAGING
Color of Kraut in Film ... 149

FERMENTATION
Manufacture of Lactic Acid ... 150

DAIRY
White Crystalline Sediment in Sweet Condensed Milks ... 152
Antibiotic Retards Growth of Gas-Formers in Cheese ... 152

FATS & OILS
Conidendrols Are Effective as Antioxidants ... 154

CEREAL PRODUCTS
Lipase Activity in Oats ... 156
Enzymes in Malting ... 156

MISCELLANEOUS
Keeping Beer Sterile ... 158
Treating Water With Ozone ... 158
Sources of Bitter Flavors in Protein Hydrolysates ... 160

DARNELL
serves

the entire
FOOD INDUSTRY

These durable, precision-built Casters assure the easy handling of heavy loads. Savings in floor and equipment wear soon pay for their cost.

• Save Money Floors, Equipment and Time by using DARNELL Casters and Wheels . . . Always dependable.

*Specify Darnell for Complete Satisfaction*

Free Manual

DARNELL CORP., LTD.
DOWNEY, (Los Angeles County) CALIF.

60 Walker Street, New York 13, N.Y.
36 North Clinton, Chicago 6, Illinois

heated to 120 F., then drained and fresh juice at 120 F. added at a ratio of 1 part juice to 3 kraut. Mixture was steam-heated at 125 F. for 10 min. then packed in laminated 120-gage pliofilm bags. Following treatments, bags were heat sealed and contents quickly cooled to 50 F.

Role of oxygen was studied by: (a) atmospheric packing; (b) exhausting to partial vacuum, and (c) nitrogen packing. Effect of metallic contamination was determined by adding cupric and ferric chloride to kraut prior to sealing. Effect of light was studied by storing one set of samples in the dark, and exposing other to light from 40w. fluorescent lamp at 24 in.

Discoloration was found due to an oxidation process. When $O_2$ was displaced with $N_2$, oxidation and discoloration were reduced. In presence of $O_2$, both Fe and Cu caused increased oxidation and discoloration. In presence of $N_2$, iron had little effect, but Cu seemed to catalyze the oxidation.

Effect of fluorescent light on color of product was first observed as a loss of green chlorophyll pigment and development of darkened appearance. This gave way to a tan-brown color.

Flavor was better when oxidation and darkening were least. Exposure to fluorescent light caused a definite burnt flavor, which developed in presence or absence of oxygen.

Digest from "Factors Affecting Color and Flavor of Sauerkraut Packaged in Pliofilm Bags," by A. Solky, J. A. Stein, and K. G. Weckel, *Food Technology*, 377-79, Oct. 1952.

## FERMENTATION

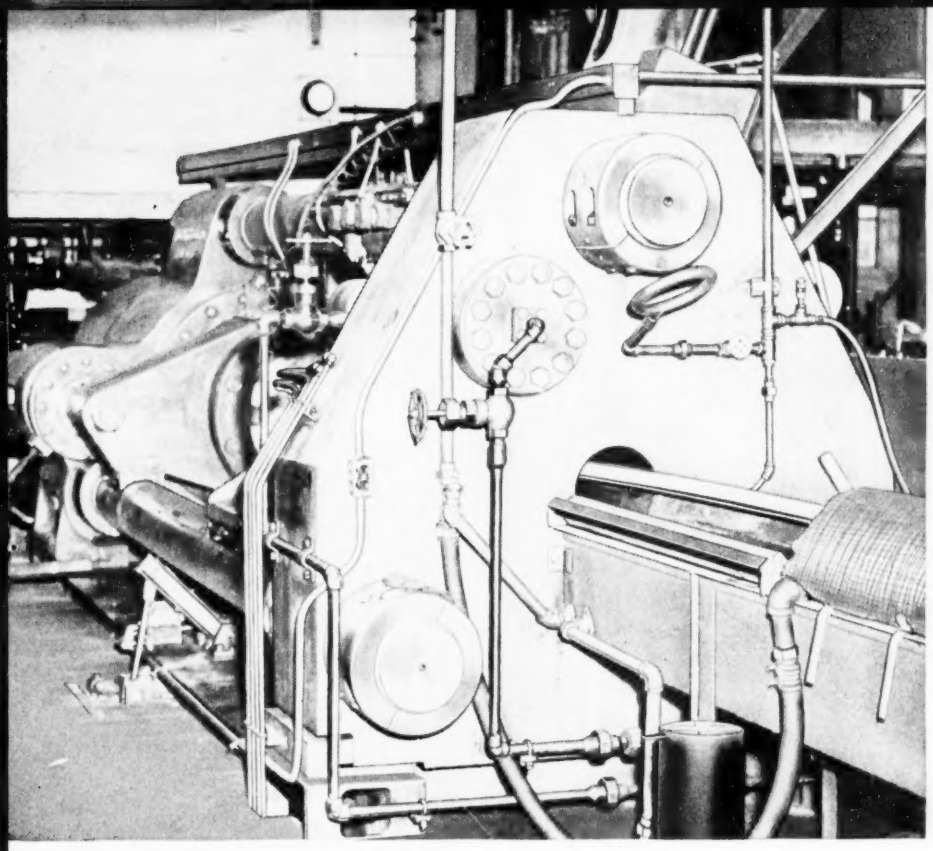
### Manufacture of Lactic Acid

Lactic acid can be readily produced from non-milk sugars, and hydrolyzed starch and molasses are suitable for fermentation by *Lactobacillus delbruckii*.

The American Maize Co. whose Hammond, Ind. plant is illustrated and described in this article, uses hydrolyzed starch or dextrose as raw material. Fermentation of the dextrose-malt sprouts-ammonium phosphate medium is carried out at 120 F. for 4-6 days. Calcium carbonate is added as needed to control pH and to convert the lactic acid to calcium lactate.

Fermentation liquors are treated to clarify, purify, and decolorize, and are then concentrated under vacuum to 32 percent solids for either spray drying as calcium lactate, or decomposition by sulfuric acid to lactic acid and calcium sulfate. Latter is filtered off and solution is concentrated to commercial strengths.

Lactic acid is highly corrosive to most metals, and metallic contamina-



## Puts squeeze on hydraulic press maintenance...

• Shown above is the 1250-ton hydraulic press used by the Light Metals Corporation of Grand Rapids, Michigan, for extruding variously shaped sections of aluminum. When this press was installed recently, officials gave the important hydraulic oil job to STANOIL Industrial Oil. They based that decision on their own experience with this outstanding oil.

That experience covered over four years' use of STANOIL in the hydraulic system of a 315-ton extrusion press. STANOIL has served continuously in this press without being changed or removed for oil maintenance. The hydraulic oil system has never been cleaned and has remained entirely free from deposits and varnish. Hydraulic operation has been efficient at all times.

The experience of the Light Metals Corporation is your assurance of STANOIL's ability to reduce hydraulic system maintenance to a minimum in your plant. This

**STANOIL**
TRADE MARK
**Industrial Oil**

versatile oil will provide clean, dependable lubrication for such a variety of equipment as air compressors, reduction gears, and electric motors. The Standard Oil lubrication specialists will help you make the most effective use of STANOIL. Phone him at your local Standard Oil (Indiana) office. Or write, Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

## What's YOUR problem?

**D. R. Clay,** of Standard Oil's Grand Rapids, Michigan, office, is the lubrication specialist who has helped Light Metals Corporation keep maintenance of hydraulic units at a minimum through use of STANOIL Industrial Oil.

He is one of many Standard Oil specialists located throughout the Midwest. These men have the practical experience and special training to handle lubrication problems on any type of operation.

Take advantage of the service offered by the lubrication specialist nearest your plant. You can contact him easily by phoning your local Standard Oil Company (Indiana) office. With his help, find how many different oils in your plant can be replaced by STANOIL Industrial Oil on such applications as:

**Air compressors** . . . no sticking or clogging of valves, less oil consumption in splash or circulating systems.

**Speed reducers** . . . less wear of gears and bearings during frequent cold starts or prolonged high-temperature operation.

**Steam turbines** . . . freedom from emulsions and sludge, fewer oil changes necessary.

**Ring-oiled bearings** . . . rings function immediately on starting, less bearing wear.

**Circulating and bath systems** . . . one oil for a wide variety of jobs.

**STANDARD OIL COMPANY** **STANDARD** *(Indiana)*

# HOW TO STEP-UP PRODUCTION —INCREASE PROFITS!

**"$51,000 saved in yearly overhead expenses"**
**"Increased truck utilization 100%"**
**"Saved $700 in one hour"**

GET General Electric's successful new book on Industrial 2-Way Radio. If your business involves material handling, construction equipment, or plant area control, this story of communications in industry is vitally important to you. Discover how G-E 2-way radio, applied to your special communication needs, reduces operating costs — improves supervision. With it, equipment handles more material in less time — emergencies are promptly dispatched — personnel do a better job on coordinated activities.

How much would a G-E installation save you next year? The local CAS* man in our G-E office will help solve your communications problem quickly. Call him!

*Communications Advisory Service*

**Instant Communication can mean more profit to your business!**

**SEND FOR THIS FREE BOOK!**

General Electric Company, Section 7013
Electronics Park, Syracuse, N. Y.

Please send me the FREE book on G-E Industrial 2-Way Radio.

NAME .....

TYPE OF BUSINESS .....

ADDRESS .....

CITY ..... STATE .....

**GENERAL ELECTRIC**


tion must be avoided. Wood is used for fermenters; acid evaporators are made of Type 316 stainless steel, which is also used for pumps, filters and heat exchangers.

Digest from "Lactic Acid from Corn Sugar," by G. C. Inskeep, G. G. Taylor, and W. C. Breitzke, *Industrial and Engineering Chemistry*, 1953 66, Sept. 1952.

## DAIRY

### White Crystalline Sediment In Sweet Condensed Milks

Low temperature storage minimizes formation of crystalline material in sweetened condensed milks. Its formation is negligible at 41 F., but crystals develop steadily at 68 and 99 F.

Quantity of sediment, which consists essentially of tricalcium citrate, varies widely and is unrelated to the calcium, citric acid, or total solids content of either raw or condensed milk. However the defect is more pronounced in milks in which the lactose has been coarsely crystallized. This suggests an association with manufacturing methods.

Digest from "Mineral Sediment in Sweetened Condensed Milks," by A. J. Lawrence, *The Australian Journal of Dairy Technology*, 52-58, April-June, 1952.

### Antibiotic Retards Growth Of Gas-Formers in Cheese

Addition of nisin, or a streptococcus lactis culture capable of producing it, to melted Gruyere cheese inhibits growth of anaerobic sporule bacteria in the packaged product.

Growth of these organisms, with formation of sufficient gas to cause swelling, or even bursting of the cans in which the product is packed, is a frequent defect of English and European fondu cheeses usually made from gruyere. Furthermore, this gas formation is accompanied by a proteolysis that detracts from the appearance of the product and makes it unfit for consumption.

Investigations have shown that growth of the clostridia is influenced by the following factors: pH and rH of the paste; percentage of water and fat; cooking temperature; nature of cheeses comprising the mixture, and temperature. All of these factors are favorable in the production of this process cheese.

Recent experiments were performed at the National Institute for Research in Dairying, Shinfield, England, to determine whether nisin was capable of inhibiting the bacteria responsible for the swelling.

Melting was done in a small steam

# Let J & L Steel Drums and Pails

## *help Your Products Sell Themselves*

**J&L STEEL**

Representative samples of J&L's complete line of steel shipping pails showing (top to bottom) the ring seal, closed head and lug covers.

Your quality product and a J&L container are a combination that you can be doubly sure will catch the customer's eye. Besides affording maximum protection against damage or contamination, J&L Steel Drums and Pails offer an opportunity to add measurably to the sales appeal of your product. Our artists are at your disposal to assist you in creating a distinctive, decorative package.

### We can provide all types of Closures, Finishes and Decorations

| | | | |
|---|---|---|---|
| Heavy-duty ICC Drums | Light-gage Drums 55, 30 and 15 gal. capacity and 100-lb. Drums | Lightweight Drums for Chemical and Powdered materials | Steel Pails for Foods, Chemicals Oils—1-10 gal. cap. |

Why not write for a free copy of our booklet "It's Safer to Ship in Steel." It will give you important information on J&L Steel Pails and Drums.

**JONES & LAUGHLIN STEEL CORPORATION**
**CONTAINER DIVISION**
**CHRYSLER BUILDING**
**NEW YORK 17, N. Y.**

PLANTS: Bayonne, N. J. • Cleveland, Ohio • Philadelphia, Pa. • New Orleans, La. • Kansas City, Kan. • Atlanta, Ga. • West Port Arthur, Texas • Toledo, Ohio

**Jones & Laughlin Steel Corp.**
**Container Division**
**Chrysler Building**
**New York 17, N. Y.**

Please send me a free copy of your booklet, "It's Safer to Ship in Steel."

Name.....

Company.....

Address.....

.....



For more information, use coupon on last page.

# For LONG RANGE EFFICIENCY

## insulate with Mundet Corkboard and Cork Pipe Covering...

Profitable production of frozen foods depends upon most efficient control of low temperature for freezers, hardening rooms, refrigerated storage and low temperature pipe lines. For long range economy and top efficiency, be sure you have MUNDET CORKBOARD for floors, walls, ceilings; MUNDET CORK PIPE COVERING for cold lines.

It pays to remember these benefits:

**1.** CORK IS MONEY-SAVING! Millions of dead-air cells in every square inch of Cork insulation cause it to serve as a most efficient *natural* barrier to heat flow. By its use, refrigeration is conserved to the most practical limits.

**2.** CORK IS LONG-LASTING! Cork has high structural strength and is a most durable material. It continues to serve for many years at highest efficiency.

**3.** THROUGH MORE THAN 80 YEARS AS CORK SPECIALISTS, we are able to preserve Corks' natural advantages in Mundet insulating products. Mundet engineers give you responsible assistance in building or expanding plant facilities. Let us help you secure low operating cost and maximum service.

**Mundet Cork Corporation**

Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

*Mundet district offices are located in these cities:*

ATLANTA 339-41 Elizabeth St., N.E.
BALTIMORE 30 612 Battery Ave.
BOSTON 57 Regent St., N. Cambridge 40
CHARLOTTE 6, N. C. 2301 N. Davidson St.
CHICAGO 35 E. Wacker Drive
CINCINNATI 427 West 4th St.
DALLAS 10 601 Second Ave.
DETROIT 21 14401 Prairie Ave.
HOUSTON 1 Commerce and Palmer Sts.
INDIANAPOLIS 56 E. Morrill St.
JACKSONVILLE 6, FLA. 800 E. Bay St.
KANSAS CITY 7, MO. 1700 Brooklyn Ave.
KNOXVILLE 1221 Grand Ave.
LOS ANGELES (Maywood) 6116 Walker Ave.
In Canada: Mundet Cork & Insulation, Ltd., 35 Booth Ave., Toronto
NEW ORLEANS 16 315-25 N. Front St.
NEW YORK 17 331 Madison Ave.
PHILADELPHIA 39 856 N. 48th St.
ST. LOUIS 9 3176 Bronnon Ave.
SAN FRANCISCO 7 660 Brannan St.
WASHINGTON, D. C. 600 F Street, N.W.

**INSULATION FOR HIGH & LOW TEMPERATURE**


heated kneading trough with a capacity of 4 kg. of grated, well-mixed Gruyere cheese. Contamination was insured by addition of clostridia sporulated cheese cultures.

Controls were prepared by addition of water and salts to the cheese in the melting trough. In test samples, water was replaced by: (1) Milk containing Str. lactis No. 12–producer of nisin, and (2) an aqueous solution of nisin. Melted samples were poured into cans and sealed, and Petri dishes were completely filled with the product. Both were incubated at 98 F. and examined daily.

Results indicate that nisin (50 units per g. of cheese) greatly reduces but does not completely prevent growth of the gas forming bacteria. Also, that the aqueous solution was more effective than the No. 12 culture.

Digest from "Inhibiting Action of the Streptococcus Producers of Nisin on the Development of Anaerobic Spores in Gruyere Fondu Cheese," by M. McClintock, L. Serres, J. J. Marzolf, A. Hirsch and G. Mocquot, *The Journal of Dairy Science*, (Pub. in Great Britain) 187-93, June, 1952.

## FATS & OILS

### Conidendrols Are Effective In Stabilizing Edible Fats

When alpha and beta conidendrol were compared with other antioxidants for prevention of rancidity in fats, oils, and fat-containing candies, they were found approximately equal or superior to other products.

Comparative tests were made with butylated hydroxyanisole and di-tert-butyl-p-cresol incorporated in edible cottonseed and peanut oils, in cottonseed oil hydrogenated to shortening consistency, and in prime steam rendered lard. Treated fats were aerated at 97.7 C. with purified air at the rate of 2.33 ml/sec.

Comparisons were made of the time required to accumulate peroxide content of 100 me/kg. Data show that fats are more effectively stabilized by conidendrols, and that peanut oil is more effectively stabilized than cottonseed oil. Beta conidendrol was superior to alpha form.

The same four antioxidants were tested for their protection of fat-containing candies. A butter cream fondant containing five per cent fat was used in a series of four tests in which: (1) The antioxidant was incorporated at a concentration of 0.10 percent based on fat content; (2) copper stearate (10 ppm.) was added, based on butter weight; (3) both copper stearate and antioxidant were used, and (4) no inhibitor or accelerator was added (control).

After 21 weeks peroxide content of

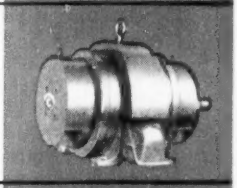
# They Shed Splashes

## Like Water Off a Duck's Back

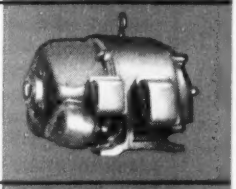
**FOR INDOOR AND OUTDOOR USE—IN A WIDE RANGE OF TYPES AND SIZES**

1 to 125 HP Squirrel Cage Induction 3 Phase *Splash Proof*

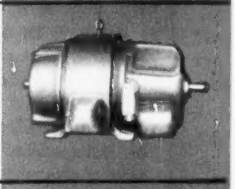
150 to 400 HP Squirrel Cage Induction 3 Phase *Splash Proof*



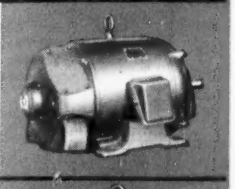
3 to 25 H. Slip Ring Induction 3 Phase *Splash Proof*



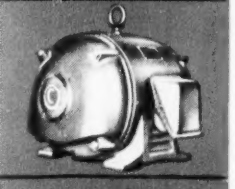
30 to 100 HP Slip Ring Induction 3 Phase *Splash Proof*



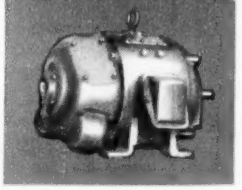
1 to 7½ HP Repulsion Start Induction Single Phase Brush Lifting *Splash Proof*



1 to 20 HP Capacitor Start Induction Single Phase *Splash Proof* — Capacitor mounted separately on 7½ HP and larger.



1 to 75 HP Direct Current *Splash Proof*



CE-758

Century

# SPLASH PROOF MOTORS

Your production is protected by a Century Splash Proof frame that keeps all squirted, spilled or splashing liquids away from the vital working parts of the motor. These motors can be hosed down during your plant clean-up without the slightest damage.

Take a look at the many different types and sizes of Century Motors that are available in Splash Proof frames. Whatever your electric motor requirements, you can specify Century — correctly and with confidence.

Century motors range in size from ⅛ to 400 horsepower — AC, single or polyphase or direct current — with drip proof — splash proof — dust proof — or explosion proof frames. Your nearby Century District Sales office, or a convenient authorized Century Distributor will be glad to give you full information.

Century C MOTORS

**CENTURY ELECTRIC COMPANY**

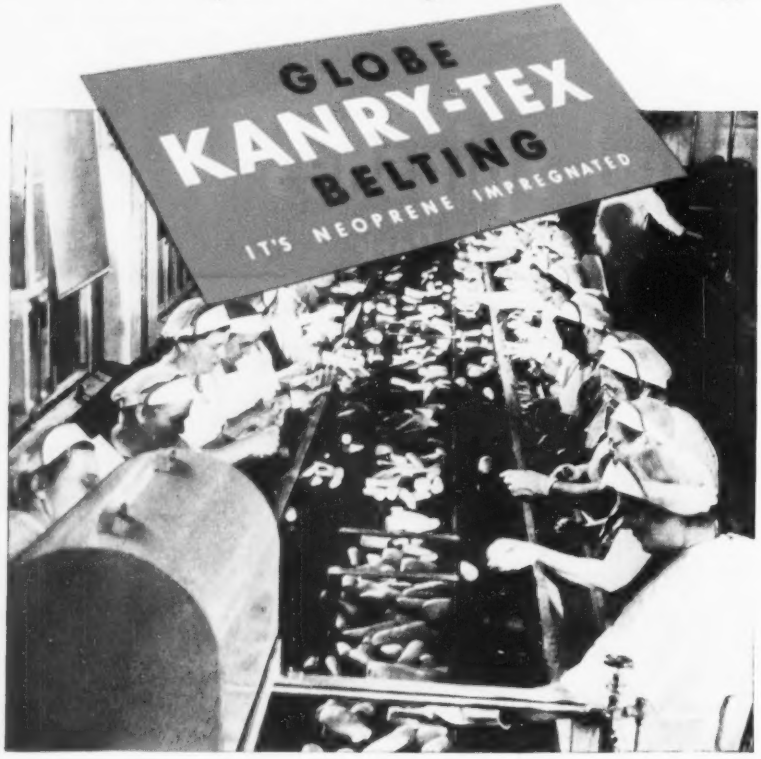
1806 Pine Street
St. Louis 3, Missouri

*Offices and Stock Points in Principal Cities*



For more information, use coupon on last page.

# removes risk of contamination in food processing and canning




• Juices, acids, alkalies, fats, oils . . . *all liquids* remain on the surface of solid woven Globe Kanry-Tex Belting. Neoprene latex impregnation of all fibres and voids *locks them out!*

Odors and flavors are not picked up nor imparted. Neoprene latex impregnation stands guard against them!

There you have two BIG reasons why fruits and vegetables conveyed with non-absorbent Kanry-Tex are not contaminated en route . . . why sorting and inspection are accomplished without adding "foreign" taste.

But there are other reasons — all just as important to food processing, canning and dehydrating plants — why Neoprene latex-impregnated Kanry-Tex is the most satisfactory of all belting. It may be washed and sterilized with hot water or live steam. Age won't deteriorate it — fibres are rot-free. There are no plies to separate. It's a solid woven carcass. It's tough, lasts longer, thereby reduces belting costs and downtime for change-over. Extremely flexible, it can be run over small pulleys. It permits slitting and trimming to narrower widths with clean-cut, unfrayed edges.

**Prove it to yourself with free samples and literature.** Write Dept. F today for samples, literature, prices and the names of local distributors.

GLOBE

**WOVEN BELTING CO., INC.**

**1400 CLINTON ST., BUFFALO 6, N. Y.**


control was 15 mc/kg. of fat; that of sample containing copper stearate was 24; while samples containing antioxidants, with and without stearate, had peroxide values of zero. All antioxidants were equally effective in preventing rancidity of fat in candy, but had no significant effect in retarding development of free fatty acids.

Digest from "The Conidendrols as Inhibitors of Oxidation and Polymerization," by C. H. Mack and W. G. Bickford, *The Journal of the American Oil Chemists' Society*, 428-30, Oct. 1952.

## CEREAL PRODUCTS

### Lipase Activity In Oats

Oat lipase is only partly inactivated by the kilning process of oatmeal manufacture. During storage of the meal or its use in baked goods, activity of the residual lipase can seriously impair flavor by liberating large amounts of free fatty acids.

An oatmeal with 4 percent moisture may have only negligible hydrolysis of its fat content, but in dough of high moisture content (30-40 percent) as much as half of the fat may be hydrolyzed to free fatty acids.

By taking advantage of the rapidity with which hydrolysis can occur in the presence of moisture, a rapid method of estimating residual lipolytic activity is possible. Meal is first defatted, then a mixture—58 parts meal, 38 parts water, 6 parts olive oil—is incubated at 37 deg. C. Free fatty acids are determined at intervals if a curve is to be plotted, or after 1 or 2 hr. if a series of meals is to be placed in order of merit based on their lipase activity.

Lipase activity is defined as the rate of hydrolysis of the olive oil at zero time, and can be obtained by plotting the tangent of the time-hydrolysis curve at the origin.

Digest from "The Measurement of Lipase Activity in Oat Products," by J. B. Hutchinson and H. F. Martin, *Journal of the Science of Food and Agriculture*, Vol. 3, 312-15, July, 1952.

### Enzymes in Malting

The two enzymes of malt chiefly concerned with degradation of starches to sugars during mashing, $\alpha$-amylase and $\beta$-amylase, have different courses of development and decay during malting and subsequent kilning of the green malt.

$\alpha$-Amylase, which appears in green malt after two days growth, is only slightly water-soluble, since much of it is absorbed on starch granules. About $\frac{1}{3}$ of the enzyme will dissolve in water at room temperature, but about $\frac{2}{3}$ of it is soluble in calcium acetate solution which is, therefore, a better agent for its extraction and study.

# A Message to Capable Men Who Are Still Earning Under $10,000

***Here Are Some Surprising Facts about the Great Demand for High-Salaried Executives Today — and What You Can Do to "Break Into" the $12,000 to $20,000 Bracket***

AMAZING as it may seem, a serious shortage of high-salaried executives exists in every branch of business and industry today. You don't have to look further than the want-ad columns to know that the really big jobs go begging. Openings exist right now for high-calibre executives who can command a salary of $12,000 . . . $15,000 . . . $20,000—and more.

### WHY the Big Jobs Go Begging

Employers are on the constant look-out for well-rounded men who show a potential for handling the big jobs. They're eager to invest in men who know the methods used by others to increase profits —men who can make money for them!

Such men are becoming hard to find. WHY? The acute shortage has been variously explained by the war years, the rapid expansion of industry, the tendency to specialize. The important thing is not why the shortage exists but WHAT you can do about it, and HOW you can qualify for the great opportunities that exist in business today.

As one of the foremost business consultants in the U. S. and the head of a large accounting firm, J. K. Lasser works with some of the nation's leading corporations. He has seen at first hand the scarcity of qualified men for high-salaried jobs. Why, Mr. Lasser asked, are there so many openings at the top—and so many men stymied in the $5,000 to $10,000 a year bracket?

### The One Ingredient That Qualifies You for a Top-Salary Job

To find the answer, Mr. Lasser went directly to the heads of companies in many fields. Consistently he heard the same answer: the one thing men in the middle brackets need to make the high salary grade is—a general, well-rounded knowledge of business procedure. "Give me a man with a basic knowledge of accounting, marketing, employee relations and taxation," one employer remarked, "and I'll lead him by the hand to a $20,000 office!"

J. K. LASSER

Featured in **FORTUNE MAGAZINE** as one of the nation's foremost authorities on business and taxes. Mr. Lasser is head of one of the best known accounting firms in the United States and Adjunct Professor and Chairman of the Institute on Federal Taxation at New York University.

This simple answer gave Mr. Lasser an idea for a brand-new plan that would literally lead men out of the $5,000-$10,000 plateau and into the top jobs. He asked the foremost men in every field to reveal working methods that have brought success in marketing, public relations, accounting, budgeting, insurance, government regulations, taxation, and the "know-how" in every business procedure for top-level management.

Mr. Lasser consulted only top men, such as business analyst Roy A. Foulke, Vice President, Dun and Bradstreet; marketing expert Marion Harper, Sr.; twenty executives nationally known for their successful methods. Then he simplified and "boiled down" this wealth of knowledge and experience into J. K. Lasser's Executive Course in Profitable Business Management—providing the all-important ingredient needed to boost men into the $10,000-plus bracket!

### What You Can Learn from These Successful Executives

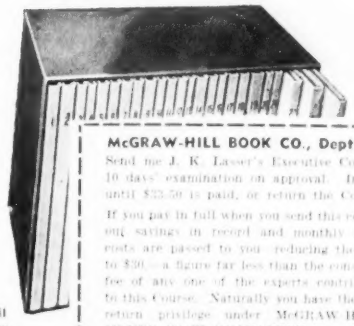
Lasser's Executive Course makes it possible for you to view each departmental operation from the top down, with an expert as your guide. You learn to talk, think, and plan with the kind of well-rounded authority expected of top-management.

You learn streamlined methods of distribution; how to run a cost system; how to design systems for internal control of business. Even hardboiled employers will be impressed by your knowledge of controlling operations through budgeting; how to avoid business frauds; and how to cut paper work in half. Your knowledge of new marketing methods, successful tax planning, and effective management under today's government controls can save and make money for any employer.

### Are You Ready for Advancement?

If you're not *sure* of your own advancement, send for Lasser's Course right away. By looking at the whole Course—noting the ground covered, the fact-filled treatment, Lasser's clear, informative style—you can quickly see how this Course can prepare *you* for advancement—back you up with the best ideas of 21 leading business experts.

Take the simple step of dropping the coupon in the mail today. No money down—no salesman will call—you merely agree to send your first installment or return the books, in 10 days. Send the coupon now—it may turn out to be one of the most advantageous steps you ever took.



**See all 24 vols.—Mail this FREE EXAMINATION COUPON**

**McGRAW-HILL BOOK CO., Dept. Food-1, 327 W. 41 St., N. Y. C. 36**

Send me J. K. Lasser's Executive Course in Profitable Business Management, 24 volumes, for 10 days' examination on approval. In 10 days I will send $5.50 and $5.00 monthly thereafter until $25.50 is paid, or return the Course postpaid.

If you pay in full when you send this coupon, only, savings in record and monthly billing costs are passed to you, reducing the price to $50—a figure far less than the consulting fee of any one of the experts contributing to this Course. Naturally you have the same return privilege under McGRAW-HILL'S MONEY BACK GUARANTEE.

(Print)
Name
Address
City Zone State
Company
Position FOOD-1

**NOTE TO EMPLOYERS:** Mr. Lasser's new course is designed to help solve your problems in readying men for top-level openings in your organization. Send us the names and addresses of men working for you who merely need more background in sound business procedures to qualify them for bigger jobs. We will gladly mail a booklet to them, fully describing the course, without charge or obligation to you.

IT'S ONLY AS GOOD AS ITS FLAVOR!

*A EUROPEAN favorite — the after-dinner cordial — has grown steadily in popularity in this country as a result of skillful promotion and the use of fine American flavors. For years, leading cordial and liqueur makers have been of one voice in their choice of flavorings — those by* FRITZSCHE . . .
*A FIRST NAME IN FLAVORS SINCE 1871.*

***Write us for Catalog C***

**FRITZSCHE** *Established* 1871 *Brothers, Inc.*

**PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.**

BRANCH OFFICES and STOCKS: *Atlanta, Georgia; Boston, Massachusetts; Chicago, Illinois; Cincinnati, Ohio; Cleveland, Ohio; Los Angeles, California; Philadelphia, Pennsylvania; San Francisco, California; St. Louis, Missouri; Toronto, Canada and Mexico, D.F.* FACTORY: *Clifton, N. J.*

The α-amylase increases rapidly during the fourth to sixth day of growth, but scarcely changes thereafter—until it begins to decline, when a temperature of 60 deg. C. is reached during kilning. Inactivation in malt of 4-5 percent moisture is 20-30 percent of the green malt level of α-amylase, and 30-50 percent of the β-amylase. There is some indication that high nitrogen barleys suffer less loss of amylase during kilning. During mashing most of the amylases passes into the wort within the first 5-10 min. The α-amylase is not rapidly inactivated at mash temperatures (65.5 deg. C.) and about ¼ of it remains active after 2 hours. The β-enzyme, however, loses practically all of its activity in 30 minutes.

Digest from "α-Amylase in Malting and Mashing," by Stella Wiener and R. H. Hopkins, *Journal of the Institute of Brewing*, 204-13, May-June, 1952.

## MISCELLANEOUS

### Keeping Beer Sterile

Sterile beer is readily obtained, by filtering it through asbestos-paper pulp sheets, and when samples are taken in sterile bottles, the product remains biologically sound almost indefinitely.

It is during passage from filters to fillers that reinfection occurs, and plate counts made on beer at the filling machines can be quite high, especially in the first beer run through the lines.

By soaking lines and handling equipment overnight in a sanitizing solution made by 1:2500 dilution of a 10 percent solution of cetyl trimethylammonium bromide, counts can be reduced to zero in beer in the lines, and to 2 or 3 in bottle beer. The sanitizing solution must be applied after usual cleanup of equipment. Ales bottled with these sanitary precautions regularly remain sound after four weeks of storage at 70 deg. F.

Digest from "Plant Sterilization in Relation in Relation to Production of Unpasteurized Bottled Beer," by H. F. P. Webber, L. Taylor, and J. Compton, *Journal of the Institute of Brewing*, 267-69, July-August, 1952.

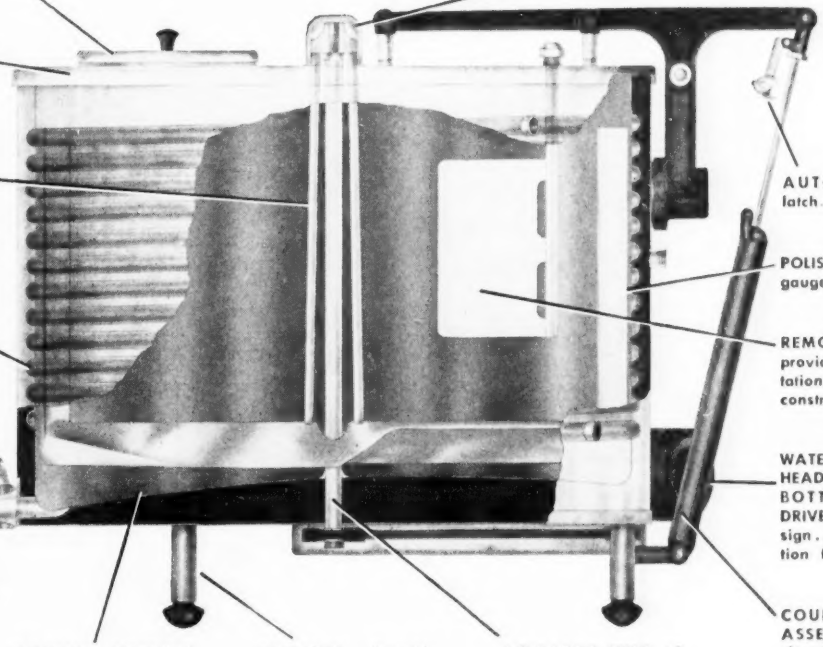
### Treating Water With Ozone

One of the industrial uses of ozone is to disinfect and purify water supplies. An example is Belmont Filtration Works, Philadelphia.

As a water treating agent $O_3$ introduces nothing not naturally present, and its decomposition product, oxygen, is both odorless and tasteless. It removes iron and manganese by oxidizing them to insoluble forms, and coagulates both inorganic and organic colloids.

For water purification, $O_3$ is generated by Siemens tubes in which a

# You'll want all these advanced Pfaudler features in your next pressure process vats . . .



INSPECTION OPENING with 5-in. "Lift-Off" stainless steel cover.

INSULATED COVER—One-piece, all welded stainless steel. Lifted by counterbalance.

AIRPLANE TYPE AGITATOR with truss supports. Can be easily lifted and disengaged from the drive shaft with one hand.

STAINLESS STEEL PRESSURE JACKET surrounded by 2-in. compressed fiberglass insulation, polished stainless steel sheathing.

PFAUDLER LEAK-DETECTOR VALVE—Plug type with special hold-down clamp to prevent leakage.

CONVEX BOTTOM HEAD—Gives extra strength and just the right pitch for complete drainage.

SANITARY adjustable leg supports.

AGITATOR TUBE of welded stainless steel extends above liquid level—no need for packing or rotary seals.

COUNTERBALANCE ASSEMBLY with enclosed spring for effortless opening and closing of cover.

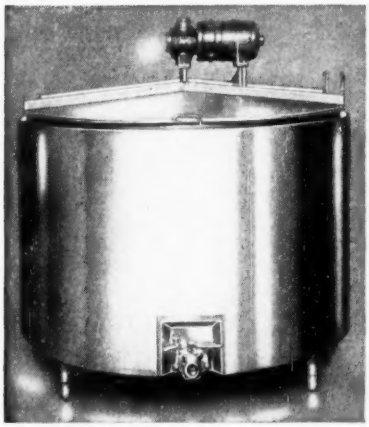
WATERPROOF GEAR-HEAD MOTOR AND BOTTOM "V"-BELT DRIVE—Simplified design . . . sturdy construction for long service.

REMOVABLE BAFFLE provides improved agitation. Stainless steel construction.

POLISHED LINER of 14-gauge stainless steel.

AUTOMATIC cover latch.

AGITATOR COVER CAP—Agitator bearing surface is above liquid level. This eliminates need for agitator opening in vat liner.



LARGE PFAUDLER pressure process vat with agitator drive at top.

For processing such products as syrups and margerine, Pfaudler Pressure "Lo-Vats" deliver the efficient heating, holding, cooling and mixing that help to keep your operating costs at a minimum. Highly versatile, these "Lo-Vats" can be readily adapted to different processes. To help speed changeovers, they are self-draining and simple in design for easy cleaning.

Jackets are built to withstand 150 lb. pressure—no danger of damage through operating error. A multiple jet manifold provides rapid heating with steam or hot water. For cooling, chilled water, ammonia or Freon can be used.

It will pay you to consider all these important Pfaudler features before you buy your next pressure vats. Made in 100, 200, and 300 gallon capacities. Also, larger Pfaudler Pressure vat with agitator installed at top is available in 500, 800 and 1000 gallon capacities.

**Pfaudler**

**THE PFAUDLER CO., ROCHESTER 3, NEW YORK**
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

THE PFAUDLER CO., Dept. FE-1, Rochester 3, N. Y.

Please send me full details on:

☐ Pfaudler Pressure "Lo-Vats"; 100, 200 and 300 gal.

☐ Pfaudler Pressure Process Vats; 500, 800 and 1000 gal.

Name .....

Company .....

Title .....

Address .....

City ..... Zone ... State .....



For more information, use coupon on last page.

# END CONCRETE DUST PROBLEMS THE SURE, EASY WAY with . . .

THE MULTI-CLEAN Method

**HUNDREDS OF FOOD PLANTS** have successfully ended their concrete dust problems this sure and easy way. Your concrete floors correctly sealed by the tested and proved Multi-Clean Method will insure your plant against the dust menace.

**THE MULTI-CLEAN METHOD** completely seals and protects the surface like a coat of armour . . . it eliminates dusting or chipping . . . reduces wear . . . keeps spilled liquids from penetrating the surface to cause unnecessary breakdown of the concrete. Maintenance time is also reduced to a minimum and dusting of stock and fixtures becomes far less frequent.

**GET THE COMPLETE STORY** about all types of floors and their maintenance by sending for your free copy of the Multi-Clean handbook, "Your Floors and How To Maintain Them."

**FREE!** Just fill out and mail the coupon. You will receive this 44-page illustrated handbook jam-packed with tested and proved ideas on floor care.

***SEND FOR YOUR COPY TODAY!***

**Multi-Clean Products, Inc.**
2277 Ford Parkway, Dept. FE-1, St. Paul 1, Minn
Send me the handbook, "Your Floors and How To Maintain Them."

*Name*

*Address*

*City* *Zone* *State*

**THE MULTI-CLEAN METHOD: The Only Complete Floor Maintenance Program Available Thru Authorized Distributors Everywhere.**



***Food Engineering* Reports**
**LATEST TECHNICAL NEWS**
**In Keeping Up With Field . . . . page 181**


silent discharge at a potential of 12,000 v. produces about 0.6 mg. $O_3$ per liter of air moving through the generator at a rate of 20 l. per min. Ozonized air is pumped into the water through diffusers located well below the level in tanks or wells.

Bacteria are destroyed by 2-5 ppm. ozone; yeasts and molds are more resistant and require 5-15 ppm. Ozone tends to oxidize many plastic materials, making them hard and brittle, but polyethylene and polyvinyl chloride are not affected. Protein solutions coagulate and oxidize. Clay suspensions are also coagulated by it. The two articles give a thorough review of the chemistry and technology of ozone and include 88 references.

Digest from "Ozone and Its Use in Water Treatment," by E. Rohrer, *Schweizer Brauerei-Rundschau*, Vol. 63, No. 8, 135-42; No. 9, 155-63, Aug. and Sept. 1952.

## Sources of Bitter Flavors In Protein Hydrolysates

A search for the substances yielding disagreeable flavors in enzymic protein hydrolysates showed that amino acids are not responsible, since most of them are either tasteless, sweet, or slightly sour.

A few have faintly bitter tastes and methionine's is slightly disagreeable. Of the proteins hydrolyzed (gelatin, egg albumin, soy protein, gluten, fibrin, lactalbumin, and casein) gelatin and egg albumin gave the blandest hydrolysates, while lactalbumin and casein digests were bitter and unpleasant.

Type of enzyme used affects degree of flavor markedly, though the enzymes themselves are not the source of the unpleasant flavor. Treatment with activated carbon (Nuchar) improves the flavor substantially, but simultaneously removes the tryptophan.

An intensely bitter fraction can be eluted from the carbon used in treating casein digested enzymically. If certain polypeptides found in the eluate are responsible for the bitter taste, enzymes that are slow to split off these polypeptides will yield hydrolysates of improved flavor, and the differences in flavor with different enzymes can be explained.

Digest from "Studies on Protein Hydrolysis. I. Preliminary Observations on the Taste of Enzymic Protein Hydrolysates," by T. K. Murray and B. E. Baker, *Journal of the Science of Food & Agriculture*, 470-75, Oct. 1952.

# YOU CAN REDUCE YOUR ICE COSTS MORE THAN 3/4 WITH A YORK-FLAKICE AUTOMATIC ICE MAKER!

If you use ice—for shipment, storage, a food process or whatever—you can cut your ice costs drastically.

A York-FlakIce Automatic Ice Maker will do many things for you:

It will provide you with clear, super-clean fragment ice at a fraction of the cost of ordinary ice. Clean? Yorkice is actually purer than the water from which it's made.

You'll use less ice. Yorkice when packed has less shrinkage and meltage loss since shingling prevents air infiltration. In processing it cools faster.

You gain space. You can mount a York Ice Maker on a platform or suspend it from the ceiling.

And you save time and labor costs, because York eliminates the need for handling, crushing or storing. You make Yorkice *when* you need it and *where* you need it.

Your nearby York Representative will be glad to make a free estimate of your needs and recommend the York-FlakIce Automatic Ice Maker that will best serve you . . . or write directly to York Corporation, York, Penna.

*For Small Plants*

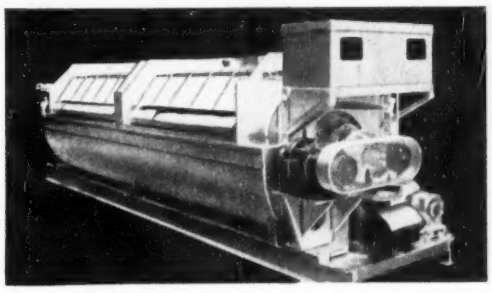
THE YORK-FLAKICE AUTOMATIC ICE MAKER DER-2

*Makes up to 300 pounds a day of crystal-clear, pure ice fragments. Compact: only 32" high and 24" wide.*

*For Large Plants*

YORK-FLAKICE AUTOMATIC ICE MAKER AP-2808

*Produces up to 30 tons a day of quick-cooling subcooled FlakIce Frozen Water Ribbons. Can be adapted to multiple unit installations.*



AMERICA USES MORE YORK ICE MAKERS THAN ALL OTHERS COMBINED!

THE BIG ADVANCES COME FROM **YORK**

HEADQUARTERS FOR MECHANICAL COOLING...SINCE 1885

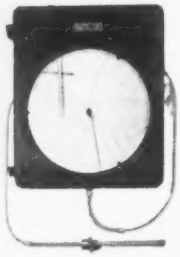


For more information, use coupon on last page.

PALMER
MERCURY ACTUATED
Temperature Indicating
Instruments

4½" DIAL THERMOMETERS

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.



RECORDING THERMOMETERS

Twelve inch die-cast aluminum case with black or white wrinkle or satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 +950°F or Equivalent in °C.

INDUSTRIAL THERMOMETERS

Red Reading Mercury —Extruded brass case — chrome finish. Ranges —40 + 950°F or Equivalent in °C.

RED-READING MERCURY LABORATORY THERMOMETERS

Thoroughly annealed for permanent accuracy. Complete line A.S.T.M. and fractional division types.

FOR COMPLETE INFORMATION WRITE FOR CATALOG 200 G

PALMER
THERMOMETERS, INC.
Cincinnati 12, Ohio • MElrose 1500

# Questions & Answers

## THIS MONTH'S PROBLEM

*Question—We've been extremely careful in selection and preparation of tomatoes and also in our canning operations. Yet, instead of winding up with a good quality canned tomato pack, we end up with a poor one—the tomatoes were almost soupy. Can you suggest where the difficulty might lie and how it can be corrected?*

### Answer to November Problem

*The Question Was—Last Fall we started to manufacture a fine line of butter-cookies with a 25-35 percent fat content. These cookies are packed in a set-up carton (1x10x10 in.) which is then overwrapped in moistureproof, heat-sealable cellophane. The cookies remained fresh and crisp during the winter months, but during the hot, humid summer months they became soggy. This condition threw our whole merchandising program out of line. Can you tell us where our trouble lies and how it can be overcome?*

Answer—Apparently you have a packaging problem—moisture vapor is penetrating your package. This moisture is then picked up by the butter cookies which become soggy.

It is important that you select a good moisture-proof transparent wrapper. Sometimes small firms may knowingly or unknowingly purchase "seconds"—a second-grade cellophane wrapper. And, in so doing, they sacrifice quality of product with this type of wrapper.

Let us assume that you are using a good moisture-proof wrapper. You may be heat-sealing the overwrap over a large area—over the entire bottom of the carton. By applying the heat-sealing element over this large area, much of the protection from the cellophane's lacquer coating is lost.

To avoid this loss in protection, we suggest you apply an electric heat-sealing iron only over the overlapped cellophane at the carton's bottom. You can permanently fix the sealing iron on the packing table so that the packer merely draws the carton across the iron.

If transparency is not essential, look into the possibility of using an overwrap that will provide maximum protection against moisture-vapor penetration. Obtain samples of various wrapping materials from suppliers and try them out. For example, a waxed glassine, with 4 lb. of ordinary paraffin wax on each side of the sheet, will guard against moisture-vapor penetration. It will also be grease-resistant.

If you wish to economize on this type of wrapper, try using unbleached, waxed glassine. However, this wrapper has an amber color. And if color is a problem, try using bleached, waxed glassine—a white, translucent wrap. If you want the wrapper still lighter in color, obtain an opaque, waxed glassine—one with white pigment incorporated into the sheet.

Perhaps you do not wish to go to a different wrapper. Then you might consider getting more moisture-vapor resistance by using two strips of waxed glassine as liners inside the carton. These strips should be arranged at right angles to each other. Cookies should then be placed in fluted waxed paper cups, and packed into the carton. The two strips of waxed paper should now overlap the cookies. In this way, you will have a substantial increase in retention of crispness.

You might also look into the possibility of altering your formula during summer months. Since butter and certain shortenings tend to become more fluid during warm weather, try reducing the amount of fat and increasing the quantity of sugar in your formula. You might also consider using a high melting-point fat.

### Spiced Apple Butter Formula

*Question—We would appreciate it if you could furnish us with a formula and detailed steps in the production of spiced apple butter.*

Answer—Here's a formula you can use to make a top-quality spiced apple butter: Apple cider, 200 lb.; apple pulp, 100 lb.; cane sugar, 25 lb.; cinnamon, 3 oz.; nutmeg, 1 oz.; and allspice, 1 oz.

Process in this manner: Boil cider, pulp, and sugar in an open, steam-jacketed kettle. Boiling in this manner produces a dark brown color—the butter's desirable, distinguishing characteristic. Concentrate the batch to 50 lb., stirring with a paddle until it leaves a trail as it is drawn across the bottom of the kettle.

At this point, turn off the steam and slowly introduce the spices. Stir continuously and continue cooking until the temperature of the batch reaches 190 deg. F.

Now, quickly fill the hot apple butter into clean, sterile glass jars, and immediately cap. No further processing is needed since the product will hold up satisfactorily.

## Re Corn Oil for Bottling

*Question—We are planning to bottle deodorized, winterized corn oil for salad and cooking purposes. Have you any information on the merits of this oil?*

Answer—Deodorized, winterized, light-colored corn oil is meeting widespread consumer acceptance as a salad and cooking oil. It is clear, odorless, and very stable. Some contend that from a standpoint of stability, it is preferred to other oils, such as cottonseed, soybean, and peanut.

In refining corn oil, it is neutralized to produce a product with a minimum amount of free fatty acids. The quantity of free fatty acids in an oil is considered an important index of quality and an indication of the effectiveness of refining and deodorizing operations. Generally, the lower the free fatty acid content, the more effective has been the deodorization and the better the odor and flavor of the oil.

Since more albuminous matter and other complex fatty acids are now removed, this oil has a lighter color than formerly.

To be used as a salad oil, it must not become cloudy during low temperature storage. Therefore, corn oil is winterized by cooling, crystallizing out stearines and higher melting constituents, and filtering off the insoluble matter.

## Trouble With Leaky Fittings

*Question—We have attempted to improve sanitary conditions in our plant by adopting tubing and fittings of the so-called "dairy type." However, we are frequently troubled with*

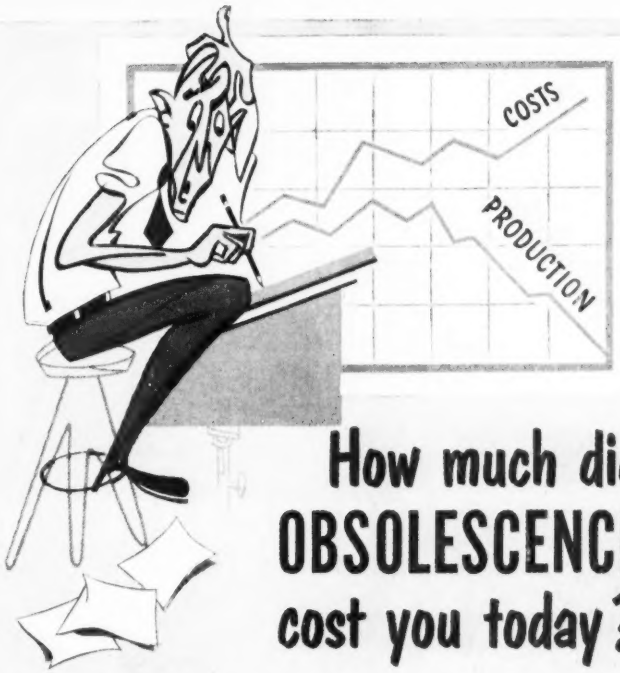
### How Would *You* Do It?

**Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.**

**What Is *Your* Problem?**

**Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.**

**Write to Questions & Answers, Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.**

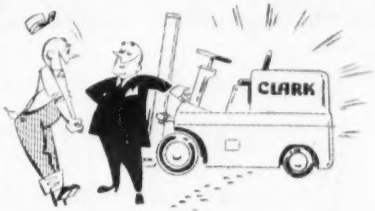

# How much did OBSOLESCENCE cost you today?

**The fastest way for a machine to become obsolete is for someone to develop a new machine to do the same job faster, better, and more economically.**

**Look at it this way. Say you operate a machine tool that turns out 50 work units an hour. If your competitor installed a 100-unit-per-hour machine at a price comparable to yours, his competitive unit cost would give you trouble. In effect, the minute he went into production, your machine became obsolete.**

**When it comes to constant efforts to improve our product, CLARK pleads guilty. The quality fork truck that you bought some years ago may be secretly (to you) suffering from obsolescence, even though it is still doing the job you bought it for. It's not hard to recognize obsolescence when it shows up in high maintenance costs and repair bills. But that's only going skin-deep. The important thing to know is this: how much faster, how much better and at how great a savings can you do the same job with today's CLARK trucks.**

**New CLARK Trucks to replace your obsolete equipment will step up production and cut service charges so drastically that they'll soon pay for themselves.**




**How much did obsolescent handling equipment cost you today? You owe it to yourself to know—and then to capitalize on that knowledge by calling in your nearby CLARK Dealer. He'll help you set up a *profitable* modernization program.**

1903 1953
FIRST FIFTY YEARS
CLARK EQUIPMENT

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS · INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 14 MICHIGAN

Please send: ☐ Material Handling News ☐ Movie Digest ☐ Have Representative Call.

Name _____

Firm Name _____

Street _____

City _____ Zone _____ State _____

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

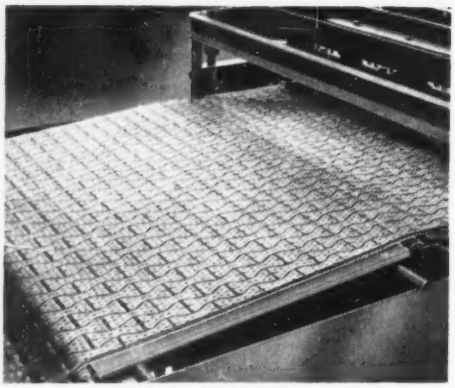


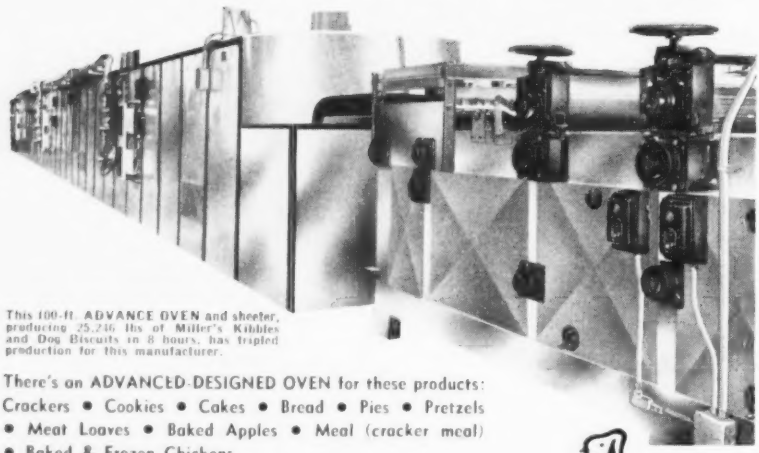

For more information, use coupon on last page.

# ADVANCE OVEN

*Triples*

**DOG BISCUIT PRODUCTION FOR BATTLE CREEK DOG FOOD CO.**





This 100-ft. ADVANCE OVEN and sheeter, producing 25,246 lbs of Miller's Kibbles and Dog Biscuits in 8 hours, has tripled production for this manufacturer.

There's an ADVANCED-DESIGNED OVEN for these products:
Crackers • Cookies • Cakes • Bread • Pies • Pretzels • Meat Loaves • Baked Apples • Meal (cracker meal) • Baked & Frozen Chickens

**CHECK THESE ADVANCE FEATURES:**

- **Controlled Top & Bottom Heat.**
- **Recirculated Heat.** Gases are recirculated over and under product.
- **Direct or Indirect Fired.** With gas, oil or electricity.
- **Porcelain, Stainless Steel, Aluminum Exteriors.**

Our many years' experience—devoted exclusively to the problems of oven construction, heating, burner and temperature control, handling, supporting and cooling of food products—enable us to custom-build an Advance Oven—designed to solve your particular food processing problem with the greatest efficiency within the space available.

We build ovens for drying, heating, baking, toasting and sterilizing . . . for batch or continuous operation. Also conveyors and cooling systems.

**FREE TECHNICAL SERVICE**
Send us details of your food processing problem. Also a rough floor plan of your plant. Our engineers will make specific recommendations, without obligation.

ADVANCE

*Write for Complete Literature*

**OVEN COMPANY**

**722 So. 18th Street, St. Louis 3, Mo.**

Western States Office: 11941 Wilshire Blvd., Los Angeles 24, Calif.
Manufactured in Canada by Fort Engineering & Sales LTD., Montreal


*leakage from sanitary unions, particularly when handling products of low viscosity. Can you suggest how this leakage can be controlled without losing the benefits of the sanitary, easy-to-clean pipe lines?*

Answer—Recently, there has been placed on the market an accessory, which is designed to overcome your difficulty. It consists of a stainless steel sleeve and dairy rubber "O" ring. This ring fits into a groove in the sleeve which, in turn, loosely fits into the tubing. When inserted in a sanitary-type union during assembly, the rubber rings forms a leakproof seal.

We assume your problem is due to improper fit of pipeline sections. Therefore, you might consider using Teflon, neoprene, or paper gaskets.

### Stabilizing Dried Eggs

*Question—We've heard of stabilized, dehydrated whole eggs. How are they stabilized, and what are the advantages of such a stabilized product?*

Answer—At present, there are two principal methods of stabilizing dried whole eggs—by acidifying or fermenting the liquid product prior to drying.

First method was developed by dried egg processors, working with the Quartermaster Corps. It involves acidifying liquid whole eggs with hydrochloric acid to a pH of 5.5, and then spray drying the mixture to a moisture level below 2 percent.

A small amount of sodium bicarbonate is mixed into the acidified spray-dried eggs. In this way, the reconstituted eggs are in a neutral range. And, when scrambled, flavor and texture of the eggs are improved.

To prevent in-package deterioration—primarily due to oxidation—dried eggs are filled into cans immediately after processing. Cans are then vacuumized and gassed with a mixture of about 20 percent $CO_2$ and 80 percent nitrogen.

Reason for this type of processing is to retard browning, in this case the harmful Maillard reaction between sugars and amino acids. Browning is definitely minimized at low pH and moisture levels. And packing in inert gases has no primary effect on browning reaction but may help in holding back secondary decomposition.

Use of acidified dried eggs has not proved too successful in prepared cake mixes, since moisture level in the mix may vary from 5 to 10 percent. This moisture level adversely affects stability of the eggs. Moreover, cake mixes are not inert-gas packed.

Stabilizing dried whole eggs by the second method involves removing the reducing sugar, glucose, by fermenta-

tion. Browning is thus retarded by getting rid of glucose—one of the reactants.

A definite retention of odor and palatability is detected when the glucose-free product is inert-gas packed in tins. Also, shelf-life of dried eggs is greatly increased.

We have learned that investigations are under way with the addition of special antioxidants into glucose-free dehydrated eggs.

Encouraging results have been obtained through use of stable dried whole eggs in prepared cake mixes. In fact, a number of processors are now commercially using such eggs in their prepared mixes.

### Milk Solids in Prepared Mixes

*Question—Can you recommend the amounts of milk solids to use in prepared cake mixes—the types packaged for home consumption? Can we use spray- or roller-processed milk solids equally well?*

Answer—Based upon the amount of flour in the formula, use up to 15 percent milk solids for white type cakes and up to 20 percent for devil's food. In both cases, the spray-processed product is recommended because it produces cakes with superior texture.

For donut mixes, 3.5 to 4.5 percent milk solids are generally added. In this case, the spray-processed milk is employed.

In cookies and similar products, both spray- and roller-processed milk solids can be used with equal results. Based upon the amount of flour in the formula, 6 percent milk solids is recommended. For pie crust mix, don't go over 3 percent. But, in this case, use non-fat milk solids.

### Treating Peeled Potatoes

*Question—We've been attempting to market pre-peeled potatoes, but have been unable to prepare a product that will keep. Is there a chemical that can be employed to preserve them? And, if so, how is it used? What type of bag would you recommend?*

Answer—Sulphite solutions are currently being used to preserve pre-peeled potatoes. However, legal restrictions in certain areas prevent the use of sulphite solutions. A waiver may be obtained in some instances if you point out that the amount of sulphur dioxide present (the actual preserving agent in the solutions) is small when compared with the amounts found in wines and certain cut, dried fruits.

In regard to the amount of sulphite


# GET POSITIVE CONTROL OVER FOOD QUALITY

WITH *Linde* Trade-Mark HIGH PURITY NITROGEN

**DURING PROCESSING**

*Blanketing* against oxidative deterioration

*Stripping* entrained air

*Drying* or *Dehydration* free from oxidation

*Blowing* feed lines

**DURING PACKAGING • STORING**

*Vacuum break-back* before closure

*Purging* container free-space

Broad experience gained in applying inert nitrogen to a variety of processes shows that nitrogen protection helps preserve natural food color, flavor, and aroma, reduces vitamin losses sharply, and increases resistance to spoilage. This positive, threefold protection of food quality means greater sales appeal, and increased profit because of fewer quality rejects.

LINDE High Purity Nitrogen is supplied to the food industry as a gas in steel cylinders, or as a liquid in tank-car and tank-truck lots. Stored at your plant, the liquid can be converted to gas as needed, or used for lightning-fast cooling.

Call or write your nearest LINDE office today. Let us show you how to apply nitrogen profitably to *your* process.

LINDE AIR PRODUCTS COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION
30 E. 42nd St., New York 17, N. Y. Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation

# CM CYCLONE

LIGHT WEIGHT — HEAVY DUTY

*High Speed* CHAIN HOIST

There's nothing to compare with it! ***63% Less Weight:*** Of Alcoa Aluminum Alloy, the 1 ton capacity weighs only 35 lbs. Carry it anywhere with ease. Designed to stand the "gaff" of maintenance work. ***42% Fewer Parts:*** Long service life. ***96% Efficient:*** Lifts loads rapidly with easier pull on the chain. ***Herc-Alloy Flexible Load Chain:*** America's first welded alloy steel chain. ***Sealed-in Lifetime Lubrication:*** No attention required. ***Low Cost:*** No more than heavy old style chain hoists. Capacities: ¼ to 10 tons.

# CM PULLER

The tool of a thousand uses for lifting, pulling, skidding, stretching, straightening. Use it vertically, horizontally, diagonally... any angle. Eliminates the dangers of makeshift methods. Holds the load where you leave it. Compact, light weight . . . the ¾ ton capacity model weighs only 13 pounds. Herc-Alloy flexible load chain. Labor saved more than repays initial low cost. Capacities: ¾, 1½, 3 and 6 tons.

**LIFTS OR PULLS AT ANY ANGLE**

*YOUR LOCAL CM DISTRIBUTOR carries the CM Cyclone and the CM Puller in stock. Phone him for a demonstration in your plant.*

# CHISHOLM-MOORE

## HOIST CORPORATION

(Affiliated with Columbus McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York, Chicago and Cleveland • Distributors Everywhere


solution to use, this will depend upon the variety of potatoes, processing techniques, type of package, and storage conditions. However, to hold prepeeled potatoes for about one week at 40 deg. F., we suggest that you dip the spuds for 1 min. in a 1 percent solution of sodium sulphite. You might even try a 30-sec. dip.

The preserving action can be strengthened by increasing the dipping time or the strength of the sulphite solution. However, stronger treatments may adversely affect the flavor of the potatoes.

Another method has been suggested. Immerse the potatoes in 0.5 per cent solutions of both citric acid and sodium sulphite for the same length of time. You must be cautioned against using too much citric acid, otherwise the potatoes will "leak" (loss of water) during storage.

We have seen treated, pre-peeled potatoes packaged in wet-strength kraft bags as well as bags lined with polyethylene. In any event, use a waterproof bag.

### Considers Coding Packages

*Question*—We are planning to place code marks on all of our packaged products. Included are those packed in glass containers, cartons, and cellophane bags. Can you suggest mechanical means for doing this?

Answer—Assuming your glass-packed items have spot labels, you may apply perforated or printed marks on them prior to labeling. Machines are available for perforating or printing labels at a rapid rate. In fact, one machine and an operator usually can supply several labelers. We do not know of a practical method of applying the marks after labeling and still register them on the same spot each time.

Cartons are a little easier to mark on a production line. Generally, the cartons pass through a carton former and sealer, where the mark can be printed by means of a printing wheel mounted on the equipment. The mark can be located with fair precision and without additional labor.

Coding of cellophane bags may present quite a problem. Of course, a mark can be hand-stamped on each bag prior to filling, but this method will entail additional labor charges. On the other hand, automatic imprinting of the finished package on a production-line basis cannot be achieved without additional labor costs because the package is not as rigid as cartons.

Possibly the best compromise is to machine-print the mark on bags before filling them. The machine, however, will have to be larger and be of slower

# The Modern Food Container!

## . . . is finding wide success as an individual coffee bag due to its many fine features

**VISKON IS ECONOMICAL!**
Gives top performance where a "breather" type package is required—at little cost.

**VISKON IS HEAT-SEALABLE!**
Generally, VISKON seals at between 350° and 500°F, corresponding with dwell time and jaw pressure.

**VISKON IS STRONG, DURABLE!**
Holds its shape, yet is soft and flexible. Has exceptionally high *wet* strength.

**VISKON IS TASTELESS!**
It's non-toxic, completely sanitary for use as a food container. Lint-free and non-raveling.

**VISKON**® **nonwoven fabrics**
*—another product to fit today's needs by*
**THE VISKING CORPORATION**
NORTH LITTLE ROCK, ARKANSAS

**VISKON** nonwoven fabrics offer a new product for packaging where porosity, product breathing, absorption, diffusion, infusion and *wet strength* are needed. **VISKON** opens up new and better ways to present your product to the consumer. Already **VISKON** has proven a success in coffee packaging. **VISKON** is suitable for packaging of tea, dried food, spices, etc.

**VISKON** is made of rayon and cotton fibers bonded with cellulose . . . can be safely used in connection with foods. It is non-toxic, tasteless, odor-free, lintless and completely sanitary.

**VISKON** is available in mill rolls, tapes or sheets—in a wide variety of weights and grades of either cotton or rayon fabric. Investigate **VISKON** today for your food packaging problems. Mail handy coupon below for additional information and samples . . . do it today!

**Please send more information about VISKON for use as a product container.**

**THE VISKING CORPORATION, Dept. FG**
**Box 72 North Little Rock, Arkansas**

*Name* .....
*Position* .....
*Company* .....
*Address* .....
*City* ..... *Zone* ..... *State* .....


For more information, use coupon on last page.

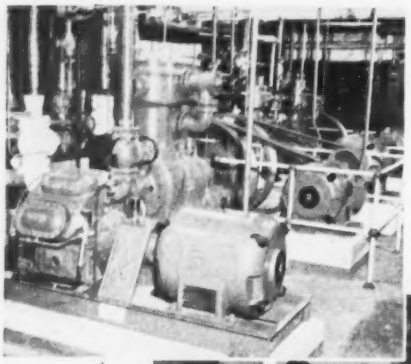
when they freeze

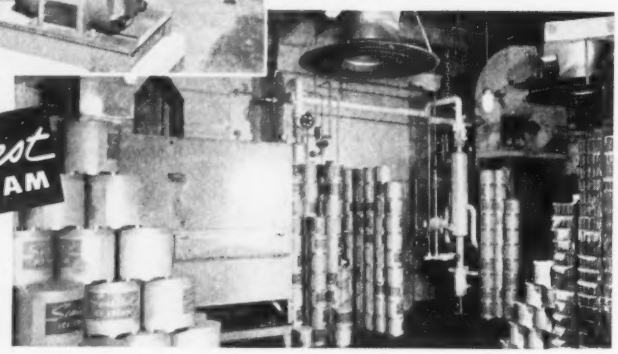
TELLING'S SEALTEST ICE CREAM

it's

VILTER

Again






Telling's Sealtest Ice Cream is a household name in Cleveland, Ohio. The Telling Ice Cream Company—a Division of National Dairies—is one of the old timers in the business. At Tellings, it's Vilter that's the familiar name. As far back as 1916 Vilter horizontal compressors were working for Tellings.

Today, Vilter still means refrigeration in the Telling plant. Three of the four old horizontal machines have been replaced by new Vilter compressors, and other Vilter compressors and boosters have been added as Telling's capacity has been increased. Now there are six newer Vilter compressors installed there . . . including a Vilter VMC Booster, and not counting the old, and still usable horizontal. Nine Vilter air conditioning units cool the hardening rooms.

It's an old story to Vilter when a plant stays with Vilter refrigeration and replaces old Vilter equipment with new after it has lived its long, useful life. The reason? Lower operating and maintenance costs, less down time, almost entire freedom from failure. Vilter's record is in the books of thousands of plants to prove it.

*The Vilter Distributor in Cleveland is L. R. Kiley*

**Write for Bulletins 101, 202, 903, 110, and 017**

Vilter®

Your nearby Vilter Distributor or Representative will be glad to show you how you can save with Vilter. *Vilter knows* dairies and ice cream plants.

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, MILWAUKEE 7, WIS.

Air Conditioning • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Double Pipe Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pakicers • Pipe Coils • Valves & Fittings


operation than the one mentioned for spot-coding labels for glass containers. This machine will cost more and labor costs will also run higher.

There is another possibility of coding cellophane bags that are to be heat-sealed. Attachments are now available for heat-sealing units which will imprint a code mark at the same time a heat seal is made. The required legibility of the code mark may indicate whether this method is as satisfactory as an imprinted mark located elsewhere on the bag.

Of one thing you may be sure. You will be in good company since many leading food processors are insisting upon adopting a complete coding system. Advantages in freshness control and trouble-shooting far outweigh, in their experience, the additional cost for coding packaged goods.

### Making Dressing Continuously

*Question—In manufacturing salad dressing, we use a starch-vinegar mixture that is made batch-wise. We suspend a weighed amount of dry starch in a measured volume of cold water, and then add this slurry, with mixing, to a hot dilute vinegar solution. It is necessary to check the acidity of each vinegar batch, which is an operation that we would like to eliminate. A more serious drawback to this method is the necessity of cooling each batch of starch-vinegar mix in a jacketed tank equipped with agitator. This operation is not only slow, but it requires a number of coolers to synchronize with other processes. Can you furnish us with information on a practical method of making the starch-vinegar slurry on a more nearly continuous basis?*

Answer—Fortunately, equipment is now available to accomplish proportioning and heat-transfer operations on a mechanized and streamlined basis.

It should not be difficult to proportion water and strong vinegar streams to produce a weak vinegar of the desired acidity. Flow of water—the larger volume—can be metered. This flow can then be used to control the flow of vinegar by positioning a throttling valve pneumatically or electrically.

If this does not control the acidity costly way to proportion the two you might consult manufacturers of instruments. They might suggest using pH, conductivity, or density measuring instruments to control the throttling valve on the vinegar line.

Another, but perhaps initially more costly way to proportion the two liquids is to use accurately controllable positive displacement or proportioning pumps. After proportioning, the two

# AL Stainless Steel Castings meet any need for Cleanliness

**Here's New Data on**

**ALLEGHENY METAL**

**in Various Industries**

Available *now*—informative booklets on Allegheny Metal in the Chemical, Petroleum Refining, Brewing, Meat Packing, Dairy, Food Processing, Hospital and Laundry Industries—others in preparation. Write for this valuable data on the field in which you are interested.

**ADDRESS DEPT. FI-37**

Note the clean, sound, fine-grained appearance of the Allegheny Metal sanitary fittings shown above, in the "as-cast" condition. They're typical of the wide variety of stainless steel castings we produce for the chemical processing, food, dairy, beverage, oil, paper and textile industries, etc.—wherever the purity and quality of products must be maintained, and where ease of sanitation and assurance of long, trouble-free service are prime considerations.

Allegheny Metal castings are produced by methods specially developed to protect uniform quality and guard against defects. You'll find them superior both from the standpoint of machinability and soundness. ● Let us quote on your stainless casting requirements—any shape and any size, from a few ounces to 5000 pounds. *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

You can make it **BETTER** with

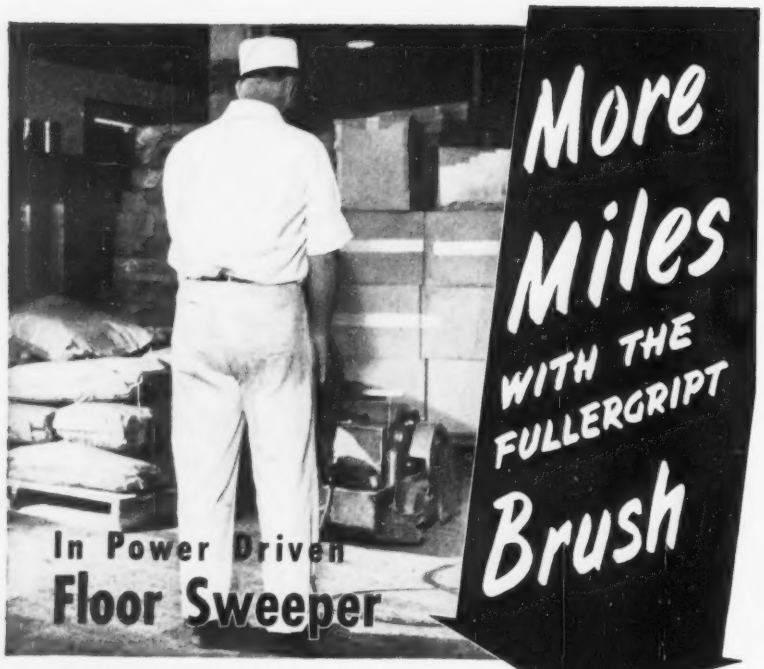
# Allegheny Metal

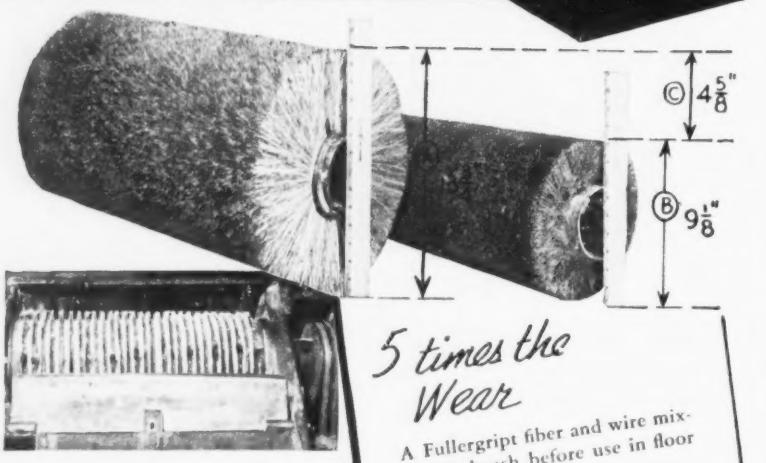
W&D 4440

AL TIME-TESTED STAINLESS STEEL



For more information, use coupon on last page.




Another Fullergript brush after 2 years, 9 months of service. This special, short-trimmed, crimped-wire brush was used to remove a thin layer of wood from a grease-soaked floor.

*5 times the Wear*

A Fullergript fiber and wire mixture brush before use in floor sweeper.

B Same brush after 10 months service — 5 times as long as the ordinary brush lasts.

C Note that although brush has worn down 4 5/8", there is no evidence of material shedding, loose backing or warping.

Users of power-driven floor sweepers consistently emphasize the longer brush life, the improved sweeping efficiency and the saving of man-hours with Fullergript brushes! Write us for information.

INDUSTRIAL DIVISION
FULLER BRUSH
FULLERGRIPT
At home... in business, too

THE FULLER BRUSH CO. • INDUSTRIAL DIVISION • 3640 MAIN ST. HARTFORD 2, CONN.


liquids must be mixed to a uniform acidity before going into the starch-vinegar mixture.

The most accurate way to make up the starch-vinegar mixture itself is to feed the dry starch by means of a weighing-type continuous feeder discharging into a metered flow of water. In this case, provision must also be made to carry out thorough mixing of the ingredients—using a tank equipped with a vertical, propeller-type agitator. Perhaps a density controller could be used at this point to vary the flow of water. This means may be necessary for a uniform mix.

After proportioning flows of water-vinegar and starch-water, it is, of course, necessary to proportion the resulting mixtures prior to heat treatment. The same suggestions mentioned heretofore should be considered for combining these flows in the desired ratio and under a continuous automatic control. Another mixing tank is required to assure uniformity of the mixture to be fed to the heat-exchange unit.

While it is evident that continuous proportioning is altogether possible with known devices, the instruments, tanks, and pumps required may somewhat reduce its attractiveness. It might be well to start modernizing by adding a duplicate of your existing measuring and mixing facilities, and then operate the two sets alternately to provide an uninterrupted flow of starch-vinegar water mixture of controlled composition to a continuous heat-exchanger.

Now to your heat-transfer problem. For this part of the process you will need a continuous, automatically controlled, easy-to-clean unit for heating the mixture to a temperature where hydration of starch will take place and then for immediately cooling it to room temperature.

Two types of heat-exchangers are currently being employed for continuous cooking and cooling of the starch-vinegar slurry. Perhaps the first employed is the jacketed Votator mixer-heat-exchangers assembly. Inside each cylinder are revolving scraper blades for slow agitation and continuous cleansing of heat-transfer surfaces. This unit is quite satisfactory for all but the most fragile type of starches.

In the cooking cylinder, hot water or low pressure steam, under automatic temperature control, serve as the heating medium. Water is satisfactorily employed in the cooling cylinders, since it is important not to chill the starch too severely and make it congeal before it is discharged.

Plate-type, Walker-Wallace heat-exchangers may also be used. However, for this assembly, it is necessary

# It's ready NOW!

# Yale's new Warehouser

## Here's the narrow aisle straddle-type truck you've waited for... more efficient—far safer—thanks to new improved YALE design.

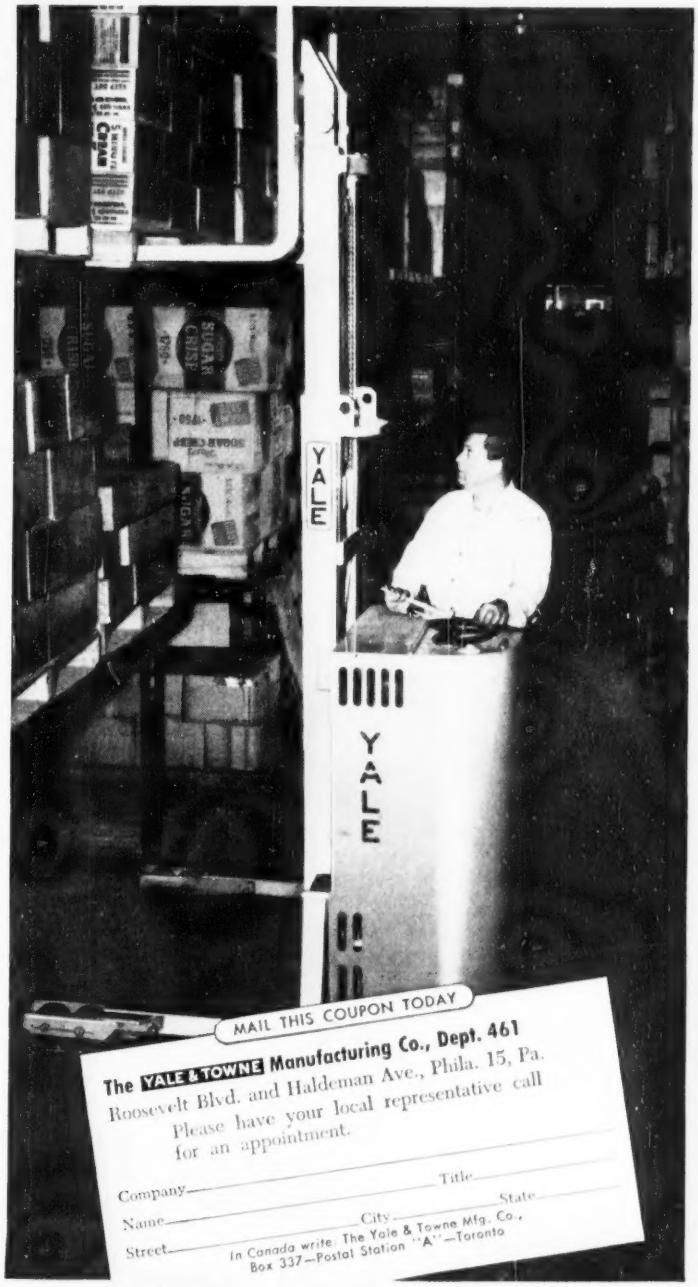
**ELECTRIC POWER**—and power to spare! There's almost no warehouse job that can't be done more efficiently and at lower cost with one man and the remarkable, trouble-free YALE Warehouser.

**SHORTER LENGTH AND ROUNDED REAR END** allows right-angle tiering in aisles 6' wide or less...doubling, tripling your present storage facilities without a cent of costly construction or remodeling.

**LIGHTER WEIGHT**—The YALE Warehouser is perfect for use over low-load capacity flooring...in elevators and on ramps...any place in older, unreinforced buildings.

**SAFER SCIENTIFIC DESIGN** places controls in center of truck for driver protection...provides a single hydraulic lifting cylinder for far better visibility ...gives never-failing "Dead Man" control that applies brakes and shuts off power the instant operator leaves truck.

*Yes, the* YALE *Warehouser is the practical, money-saving answer to your modernization program. If you are considering new construction or the remodeling of your present storage facilities, consult with* YALE...*learn how this new, improved truck can help you get more use from every square unit of storage space.*




MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 461
Roosevelt Blvd. and Haldeman Ave., Phila. 15, Pa.
Please have your local representative call for an appointment.

Company_____ Title_____
Name_____ City_____ State_____
Street_____

In Canada write: The Yale & Towne Mfg. Co., Box 337—Postal Station "A"—Toronto

# YALE*

MATERIALS HANDLING EQUIPMENT

*Registered trade mark

**Gas and Electric Industrial Trucks • *Worksavers* • Hand Trucks • Hand and Electric Hoists • Pul-Lifts**



For more information, use coupon on last page.

# Exciting flavors are the foundation for exciting sales

**COSMO Flavor Line**

All-purpose flavors, extremely powerful . . . For high quality flavoring at very low cost.

**DOLCO® 5200 Flavor Line**

D&O improves on nature with these highly concentrated, top-notch imitations of natural fruit flavors available in 20 popular flavors. All color derived from the natural fruit.

**DOSIX® Flavors**

True fruit flavors, reinforced with other natural flavors. Particularly useful for fountain syrups, pectin jellies, cream centers, icings and ice cream.

**DOLCOTT® Hard Candy Flavors**

Natural extractives fortified with synthetic aromatics, especially useful where very high temperatures are employed.

**MICROMUL Flavors**

Especially designed for flavor manufacturers of all types of household and bottlers' flavors and concentrates.

**AP-RO-PO Flavors**

For the hard candy manufacturer who requires realistic flavors at low cost.

*Excellent selection in all Flavor Lines. Ask for Bulletins or new Flavor Catalog.*

D&O ESTABLISHED 1796

**DODGE & OLCOTT, INC.**

180 Varick Street • New York 14, N. Y.

SALES OFFICES IN PRINCIPAL CITIES

ESSENTIAL OILS • AROMATIC CHEMICALS • PERFUME BASES • FLAVOR BASES • VANILLA


to employ the high-pressure type, since pressures built up in pumping the cooled starch mixture through narrow passages far exceed the working rate of the conventional dairy-type plate heat exchanger. By the same token, the pump must deliver against this pressure. Satisfactory for this purpose is the sanitary, positive-displacement type pump.

It is suggested that you consult manufacturers of heat-exchangers of the types mentioned. Make certain that you fully understand details on temperatures and capacities so that equipment of the proper size and performance will be purchased. On this depends the success of the entire process.

### Going About Making Yogurt

*Question—Can you furnish us with detailed information on the commercial preparation of yogurt?*

Answer—The manufacture of yogurt is similar to making acidophilus milk. It is produced by the combined action on milk of three strains of bacteria—*Streptococcus acidi lactis*, *Lactobacillus bulgaricus*, and *Thermobacterium yogurti*. By fermenting the milk, these bacteria produce 1.0 to 2.0 percent acid (expressed as lactic). As a result, the milk coagulates and develops a very pleasant aroma and flavor.

The process is neither difficult nor lengthy. Fresh milk is pumped into jacketed, stainless steel holding tanks, equipped with agitators that prevent the cream from rising to the surface. From these tanks, the milk goes to a centrifuge that removes any foreign matter. Now, the milk is preheated to 135 deg. F. in a cabinet-type cooler. Preheating inactivates the enzymes that produce an undesirable tallowy flavor during homogenizing—the next step in the process.

Next, the milk is sterilized. It is heated at 180 deg. F. to destroy microorganisms. Then the milk is inoculated with the pure culture, which is prepared daily in the plant bacteriological laboratory.

After inoculation, the milk is pumped to an automatic filling machine. Here, the milk is vacuum-filled into jars or paper cups, which are then machine-capped. Containers then move into an incubator, where the temperature is automatically maintained at 112 deg. F. After approximately 3 hours' incubation, yogurt is produced. At this stage, the product has a characteristic smooth, custard-like consistency and nutty flavor. Finally, the containers are placed in a 32-36 deg. F. refrigerator, until desired acidity forms.

## Revisions by Model

—Continued from page 93

other, particularly respecting the factors of up and down distances and positions of the various equipment and connective elements.

To remodel this building while operating meant that floor space had to be cleared by removing equipment or suspending it from ceilings—then new reinforced concrete columns and floor could be poured. Following this would come set-up of equipment—installation of the new and the retained machinery on permanent foundations. Then resumption of production and on to a similar procedure in other floor areas.

It was soon obvious, in the company's first approach, that things were much more complicated than originally conceived. Because of need for uninterrupted production, all steps taken had to be sequenced and synchronized with the 22 unit operations taking place in the millhouse—and each change had to be held in the realm of sound engineering. Yet all this had to be accomplished with a limited number of technical people, since the company, like so many others today, is plagued by a shortage of engineers.

### Into the Third Dimension

But then it occurred to the executives that some new, vivid way of reflecting developments in the project had to be created—something that both operating and technical men alike could "get their hands on" to actually try out new ideas. The answer they hit on was a scale model of the millhouse, along with a full complement of scale-size machinery, enabling miniature "dry running" at the whole job.

To permit seeing inside from top to bottom, the model's floors and building columns were made of transparent plastic. This allowed the planners to more quickly locate machinery, piping, pumps, and other machinery.

Completed, the model proved exceptionally versatile for shuffling units to depict the modernization program at any point in its development.

It has paid for itself manyfold. Already, for example, it has saved more than its cost in preventing installation miscalculations in flow-lining units.

As one project engineer pointed out, "When you're dealing with stainless steel—used almost universally in our new process—it doesn't take many such caught-in-time miscalculations to pay for a scale model!"

End (Resume reading on page 94)

TELLS HOW THE
DAY "AC"
DUST FILTER
WILL FIT INTO
YOUR OPERATION
MORE EFFICIENTLY
AND ECONOMICALLY

Licensed by H. J. Hersey, Jr.

- Continuous-automatic cleaning with never a shutdown for shaking or rapping
- More economy in space, installation and maintenance costs. Recovers valuable product
- Unsurpassed for keeping the plant clean and sanitary

We've checked only three of the outstanding advantages you get in a DAY "AC" Dust Filter . . . there are many more especially desirable for handling dust peculiar to food processing. That's why we've compiled Bulletin No. 528 which will give you all the facts and figures on the operation of this highly efficient Dust Filter showing why it is so applicable to the Food Processing Industry. The bulletin also shows how DAY engineers can help you toward the solution of any food processing dust problem.

We want you to have the complete story, and a request on your letterhead will bring it to you. Simply ask for Bulletin No. 528 which contains complete detailed information on DAY "AC" Dust Filters, a Dust Problem Analysis Sheet for your convenience in making a dust check in your plant, and information on other DAY air handling and air cleaning equipment.

Write for your FREE copy TODAY!

The DAY Company
SINCE 1881
817 3rd Ave. N. E., Minneapolis 13, Minn.
IN CANADA: P. O. Box 70D, Ft. William, Ontario
Branch Plants in Ft. Worth, Buffalo and Welland, Ontario

**WYANDOTTE PRODUCTS**

Wherever food products are manufactured or processed — in bakeries, breweries, confectioneries, dairies, canneries — Wyandotte cleaning products have proved most efficient and effective in maintaining high standards of sanitation.

**Just as important, years of experience have enabled Wyandotte to greatly reduce the number of products needed to do your complete sanitation job. This cuts your costs, saves valuable storeroom space, avoids confusion!**

Let a Wyandotte service man help you plan your cleaning program. He's familiar with equipment cleaning, germicidal treatment and general *plant* cleaning. He will help you without cost or obligation. Call on him today or mail the coupon below.

**Wyandotte CHEMICALS**

**Wyandotte Chemicals Corporation**
**Wyandotte, Michigan**

Please send data on the following:

Name

Firm

Address

City Zone

State


# Useful New Books & Government Publications

## Vitamin E Expounded

ANNOTATED BIBLIOGRAPHY OF VITAMIN E, VOL. II. *Published by Distillation Products Industries, Rochester 3, N. Y. Distributed by National Vitamin Foundation, Inc., 150 Broadway, New York 7, 1952. 106 pages; 8½x10½ in., paper. Price* $2.00.

Exposition of Vitamin E in this work covers scientific literature published on the subject in 1950-51. Also presented are some abstracts of papers mentioned only by title in Vol. I. Included are new entries of the 1940's which have since been located.

Work correlates the vitamin's occurrence and distribution, with effects on human physiology and pathology.

## Vs. Candy-Plant Explosions

CODE FOR THE PREVENTION OF DUST EXPLOSIONS IN CONFECTIONARY MANUFACTURING PLANTS. *Published by National Fire Protection Assn., 60 Batterymarch St., Boston 10, 1952. 12 pages; 4¼x7¼ in., paper. Price* 25c.

Dust-explosion hazards in candy plants are covered in this small volume, along with recommended and approved standards for their prevention.

Outlined are points where explosion-type accidents are most likely to occur. Covered, too, are safety measures to take in building construction. Not underestimated are plant cleanliness and concomitant responsibilities of employer and employee alike.

## Re Pectin Components

THE PECTIC SUBSTANCES. *By Z. I. Kertesz. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, 1951. 628 pages; 6¼x9¼ in., cloth. Price* $13.50.

Numerous facets of the pectin picture are thoroughly and notably detailed in this extensive study.

Divided into five parts—chemistry, botany, biochemistry, manufacture, functions and applications—text is replete with information valuable to the food processor. Recognizing the correlation of pectins with a host of food products, the author advances and corroborates many facts of service to the field.

Of direct application in this regard is the information on the manufacture of pectin, where it is found, and in what quantity. Examples of use follow. There are scientific data on its place in sugar, details on its employment as an emulsifying agent in salad dressings and mayonnaise, and facts on its use in dairy products, fruit spreads, and wines—to mention only a few applications.

An excellent work for laboratory or plant men concerned with pectin extraction or utilization, it is authored by Z. I. Kertesz, member of the N. Y. State Agricultural Experiment Station, Geneva, N. Y.

## Industrial Relations Text

CONCILIATION IN ACTION, PRINCIPLES AND TECHNIQUES. *By Eward Peters. Published by National Foremen's Institute, Inc., New London, Conn., 1952. 266 pages; 5½x8 in., cloth. Price* $4.50.

Cyrus Ching's observation that "The mediator is a bridge between the parties . . ." is well-recalled in reading this text on labor relations. The value of a third party—the arbiter—in settling discordant disputes sets sharp focus in the illustrative case histories presented in the text.

As cited, the goal here is to give management, negotiators, labor relations people, and conciliators inside working techniques of current collective bargaining and conciliation practices. These apply to strikes, deadlocks, public opinion, loyalty, and a number of intangible factors.

Equipped with this volume—and a tough hide—a novice conciliator should find his task easier. Information is voluminous and highly interesting from the "human factor" standpoint.

The author is with the California State Conciliation Service.

## "Specialized" Soybean Story

THE SOYBEAN INDUSTRY. *By Ray A. Goldberg. Published by Univ. of Minnesota Press, Minneapolis 14, 1952. 186 pages; 6x9¼ in., cloth. Price* $5.00.

Replete with graphs, charts, tables, and indexes—plus a well-written text—this volume goes far in clarifying the total picture of the soybean field.

Yet it is, in a sense, a specialized treatise within this sphere. For its basic theme is the soybean field's growth insofar as it has affected Minnesota. This state was one of last to develop a soybean crop—but its dollar value from 1940 to 1950 rose from $76,000 to $37,000,000!

Nonetheless, as facts are espoused on the progress and future of this

Gopher-state crop, its interrelation with elements of production, utilization, and processing on a national scale are readily evident.

Touched upon, too, are aspects of transportation, storage, commodity markets, and price formulation.

Author holds a Ph.D. in agricultural economics from the University of Minnesota.

## Dirt Ridders Discussed

DETERGENTS: WHAT THEY ARE AND WHAT THEY DO. *By Dr. Donald Price. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York, 1952. 159 pages; 5¼x8¼ in., cloth. Price $4.*

"Dirt has been defined as matter in the wrong place" begins this volume. It then proceeds to describe detergents and evaluate them on their ability to banish such ill-placed matter.

Direct, simple, and concise, the work does much to bring to light the scope and nature of detergents. It is technical in that it reveals the chemistry of the various surface-active agents. Also, it illuminates the mechanism of their action in removing water hardness and wetting hard-to-wet surfaces.

Industrial detergents are given full treatment. The book concludes with a note on the future of these cleaning agents.

The author is technical director of Oakite Products, Inc.

## Legal Angles on Fluorine

FLUORIDATION OF MUNICIPAL WATER SUPPLY—REVIEW OF SCIENTIFIC AND LEGAL ASPECTS. *Published by National Institute of Municipal Law Officers, 730 Jackson Pl., N.W., Washington 6, 1952. 62 pages. Price $3.00.*

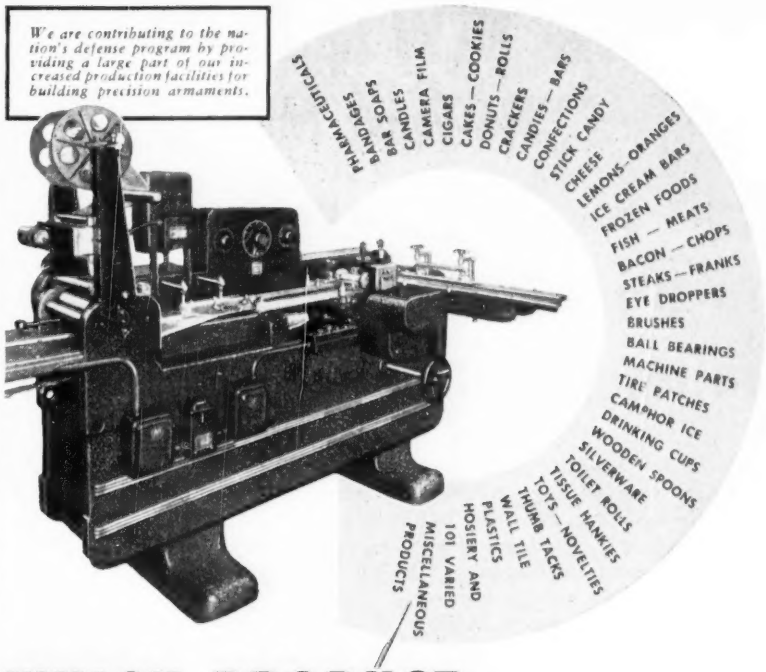
Actual and potential legal questions are herein discussed. Program's historical background, some technical aspects, and extent of acceptance as public health measure also come under review.

## Government Publications

PREPACKING TOMATOES. *USDA Report No. 20. 58 pages. Price 30c.* Reports 14-plant survey, indicating labor efficiency averaged 36 percent increase when most efficient methods were adopted.

AN ANALYSIS OF SOME METHODS OF LOADING OUT DELIVERY TRUCKS OF PRODUCE WHOLESALERS. *U. S. Dept. of Agriculture, Report No. 15. Price 25c.* Describes six methods of loading


*We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.*



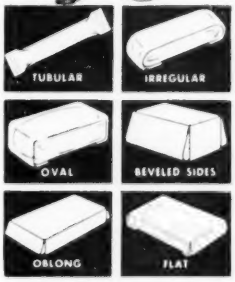

**WHICH PRODUCT . . .**

**would you like to package**

**?**

***BETTER CHEAPER FASTER...***

***at Speeds of 3 Units per Second!***




Solid or fragile — regular or irregular shapes — single or multiple products per unit. It makes no difference to the automatic, continuous feed, high speed operation of the Campbell Wrapper. You achieve important savings in labor and materials, too. Automatic feeds, in many cases, permit *one* person to tend several machines — And, boards or stiffeners need *only* be used if desired! Machine wraps all modern packaging materials and films with equal ease, accurately positions pre-printed identifications and provides a full range of wrapper closures . . . crimped, flared, folded . . . glue or hermetical sealing. Send us a sample of your product for a detailed report on how the Campbell Wrapper can improve and *speed up* your packaging.

New York office 55 West 42nd St.

*Write for illustrated brochure.*

**Campbell**
**WRAPPER**
**HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.**
*Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.*




For more information, use coupon on last page.

(Advertisement)

# With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No-Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

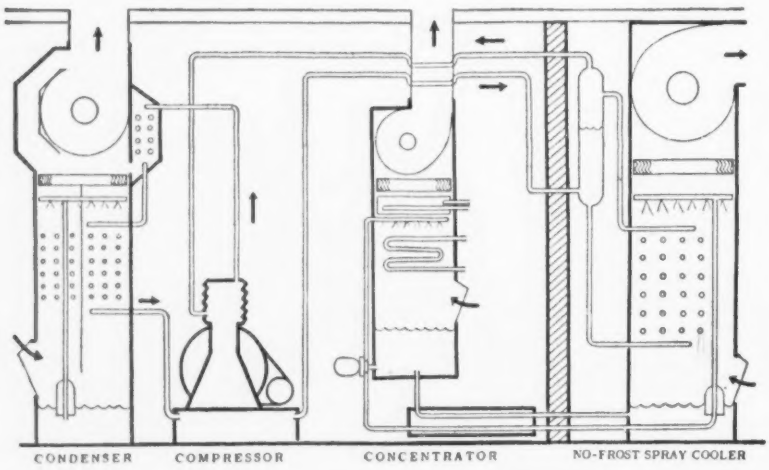
Now, a NEW design No-Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature — not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment — one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use — both for freezing and for moderate temperatures — for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

For complete information write to the Niagara Blower Company, Dept. FI 405 Lexington Avenue, New York 17, New York.




A simple method, easily maintained. Saves a third of your refrigeration cost. Ask for Niagara Bulletins 118 and 119.

out, analyzes comparative efficiency, and reports direct costs by each method.

U. S. Government Organization Manual, 1952-53. *Revised July 1, 1952. 742 pages. Price* $1.00. Annual handbook describes all Government agencies, legislative, judicial, executive, and some international organizations. Includes appendixes relating to abolished or transferred agencies, to government publications, and to certain auxiliary material.

Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products. *Production & Marketing Admin., USDA.* 96 *pages.* Provides uniform conversion factors in handbook form, revising Aug. 1947 document of same title.

Agricultural Outlook Reports. *Bureau of Agricultural Economics, USDA.* In connection with 30th Annual Agricultural Outlook Conference, Department has issued statements and publications giving text and tabular information for all agricultural commodities.

---

*These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.*

---

Peanuts and Their Uses for Food. *U. S. Dept. of Agriculture, Report No. 16. Price* 45c. Discusses commercial food uses of these nuts, along with statistical analyses.

Source Materials on Water Pollution Control. *U.S. Public Health Service, Publication 243. Issued* 1952. A representative bibliography.

—*End*—

## Cleaning Pipelines

—*Continued from page 86*

---

or 9 hr. 36 min. (Table IV). The saving was 419 min., or 6 hr. 59 min., for raw milk lines and 157 min., or 2 hr. 37 min., for the shorter length pasteurized system.

No attempt was made to rate the workers or to determine the time that should be required to do a specific job. Changes in cleaning crews, frequency with which the complete

breakdown of the pipe lines was carried out, and the fact that the workers may speed up the cleaning process when being observed, are some of the factors that may influence labor analysis.

**Auxiliary Use of Solution Tank.** A further application of the cleaning tank as a labor-saving device was obtained after some of the rubber parts of the bottle filler were found to be covered with a thin fat film that was responsible for occasional coliform contamination. It was suggested that the filler valve rubbers and vacuum seal rubbers be wired together and dropped into the cleaning tank and left there throughout the entire cleaning cycle. This eliminated almost all of the time and labor formerly required to hand-brush and clean the 114 rubber parts from the two fillers.

The high temperature and the alkaline detergent effected a rapid removal of all milk residue from the filler parts, and a marked improvement in both physical and bacteriological condition was noted. Separator disks also have been cleaned in a similar manner.

### To Summarize

Recirculation of a balanced, highly alkaline detergent solution containing relatively high levels of wetting agent at 170 deg. F. appears to offer a practical, effective method of cleaning sanitary stainless steel and glass piping in the milk plant. Although they present some physical disadvantages, glass lines appear to be somewhat easier to clean by recirculation methods than stainless steel lines.

During the study, bacteriological condition of the lines of sanitary piping cleaned by recirculation has been excellent at all times and appears definitely superior to the bacteriological condition of lines cleaned by conventional methods.

Lines should be sloped so as to be self-draining. This facilitates rapid draining of washing and sanitizing solutions, and it avoids milk standing for long periods of time in "dips" or uneven portions of the piping system.

The automatic circulation equipment developed in this study was unusually effective and required a minimum of attention. It is suggested that recording devices be included on such equipment to assist plant personnel in supervising the cleaning cycle and to assure that the process is properly carried out.

Valves should be removed from the valve seat after the washing solution is circulated and each valve and valve seat brushed clean and then sanitized, preferably with quaternary ammonium solution.


Photo — Courtesy R C A

**No broken bottles here**

**TRAFFIC** moves right along here —no jams, no bottlenecks— thanks to the three little boxes hooked up to this conveyor chain.

They're Oakite Lubricators, and they're filled with Oakite Composition No. 6, the wet soap lubricant that stops bottle breakage by reducing gate pressure. Leaves no gummy deposits on chain or bottle bottoms, actually cleans the conveyor as it lubricates. Reduces drag, helps hold motor burnouts to a minimum. Cuts power costs as much as 50%, out-of-service time as much as 90%.

Oakite Composition No. 6 is just one of Oakite's conveyor chain lubricants. There's Oakite Composition No. 12 for hard water areas—Oakite Soluble Oil for conveyors that operate under freezing conditions.

The Lubricators? They're loaned *free* to users of Oakite Lubricants. There's one designed for every conveyor—bottle, case, flat-top jar: designed to keep the solution flowing, keep your conveyors gliding right along.

**FREE HANDBOOK** tells how to get better lubrication. Ask your Oakite Service Representative, or write Oakite Products, Inc., 27A Rector St., New York 6, N.Y.

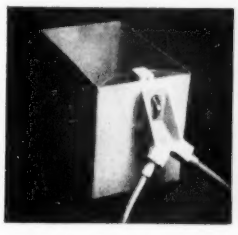
SPECIALIZED INDUSTRIAL CLEANING

**OAKITE**

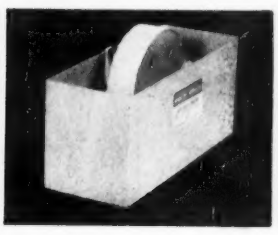
MATERIALS • METHODS • SERVICE

*Technical Service Representatives Located in Principal Cities of United States and Canada*

**THE OAKITE LUBRICATOR**
Solution flows through drip tubes onto chains



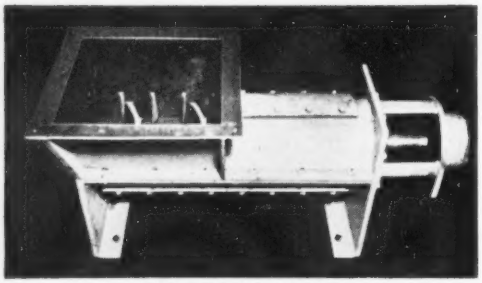
**OAKITE CASCADE LUBRICATOR**
Solution sloshes over chain as it moves over the roller



**OAKITE DRIP TANK**
Pre-mixed solution drips through pet-cock

CASE HISTORY SERIES

GRINDING GREEN BONE for DOG FOOD



RIETZ PREBREAKER

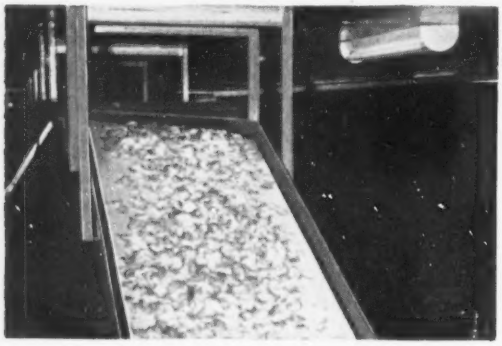
Green bone, including leg bones, rib sections, passed through the Rietz Prebreaker for preliminary reduction to minus 2" particle size—then through an RD-18-D Rietz Disintegrator with 75 H.P. for final grinding to hamburger-like consistency, ideal for inclusion with dog food.

Capacities from 2000 to 3000 lbs. per hour obtained. Grinds bone, marrow, meat and fat simultaneously and affords substantial savings to dog food processors.

*Write for free technical literature covering the above installation*

*Equipment for the food and chemical process industries*

Rietz MANUFACTURING CO.
Santa Rosa, California



SUPRENE BELTING...
*Likes Having Its Face Washed!*

Wherever cleanliness is a factor . . . in cleaning fruits and vegetables, in the manufacture of biscuits, crackers, bread, candy and cheese . . . *sanitary, Suprene Belting is always in demand!* That's because it's so easy to keep clean! . . . washes like new with steam or hot water.

A superior cotton duck belt, Neoprene impregnated, it is highly resistant to the corrosive action of fats, greases and fruit acids. Odorless, tasteless and waterproof, Suprene Belting offers years of safe and sanitary conveyance. Available in a variety of plies and four styles to meet all your food handling requirements. Send for Bulletin 20.

Victor
Balata & Textile Belting Co.
33 Park Pl., N.Y. 7 • 300-6 W. Hubbard St., Chicago 10
Factory: Easton, Pa.

6639


Non-porous Neoprene and Teflon gaskets have been left in place for extended periods of time. When removed, the bacteriological and physical condition of the gaskets appeared to be excellent.

To insure that all lines are continuously filled during the wash and rinse process, it is recommended that back pressure be applied through the use of a valve or restricted opening at the outlet of the recirculating system.

All circulation cleaning procedures required approximately one-fourth as much time as disassembling, hand washing, and reassembling of the pipe lines.

## References


1. Fleischmann, F. F., and Holland, R. F. "Permanent Pipelines Cut Cleaning Costs." Food Eng., 23, 58-60, Nov. 1951.

2. Brockmeyer, D. H. "Possibilities In the Use of Permanent Sanitary Piping in Dairy Plants." *Proc. 43rd Annual Convention Milk Ind. Foundation, Vol. 4, Lab. Section*, 18-21, 1950.

3. Fleischmann, F. F., White, J. C., and Holland, R. F. "Glass Lines Do A-1 Job; No Take Down to Clean." Food Ind. 22, 47-51, 182-83, Oct. 1950.

4. Moore, A. V. "In Place Cleaning of Sanitary Pipe Lines." *The Milk Dealer*, 41, 146-51, Sept. 1952.

5. Moore, D. R., Tracy, P. H., and Ordal, Z. J. "Permanent Pipe Lines for Dairy Plants." *J. Dairy Science*, 34, 804-14, 1951.

6. Sheuring, J. J., and Henderson, H. B. "The Use of Glass Sanitary Pipes in the Modern Plant." *Southern Dairy Prod. J.*, 49, 52-53, 64-65, Jan. 1951.

7. Haskell, W. H. "Cleaning and Sanitizing Permanent Pipeline Installations." *The Butter, Cheese & Milk Prod. J.*, 43, 33-34, 60-62, May, 1952.

8. Gallistel, A. F. Personal Communications.

9. Havighorst, C. R. "Revolutionary Advance In Dairy Engineering: Permanent Welded Pipelines." Food Eng., 23, 74-79, Sept. 1951.

10. Hodes, M. P. "Tips on Designing and Operating Cleaned-In-Place Pipelines." Food Eng., 24, 80-82, 212, Sept. 1952.

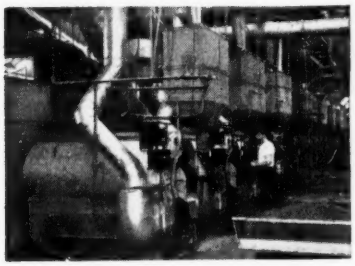
11. Myers, R. P. "The Germicidal Properties of Alkaline Washing Solutions With Special Reference to the Influence of Hydroxyl Ion Concentration." *J. Agr. Res.*, 38, 521-63, 1929.



*Identification and acknowledgment: The above article is designated as Technical Paper No. 755 of the Oregon Agricultural Experiment Station. Published with approval of the Station director, it is a contribution of the Department of Bacteriology, Agricultural Economics, and Dairy Husbandry. This study was financed in part by a grant from the Damascus Milk Co., Portland, Ore. And contributing in large measure to the success of the project was the splendid cooperation of plant and laboratory employees in all phases of the investigation—The Authors.*

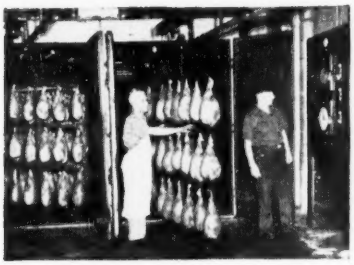

End (Resume reading on page 87)

# VOLUME food processing WITH GAS



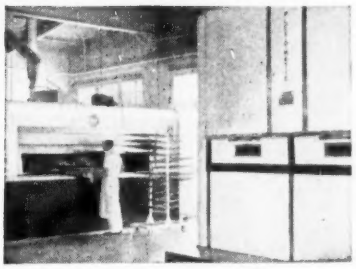
## COFFEE ROASTING

Fast, uniform roasting is assured with this battery of 9 Gas-fired batch roasters, which has an annual output of 25,000,000 pounds. Gas does this job uniformly, economically and dependably.



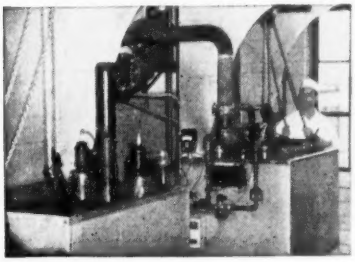
## MEAT CURING

Gas burners char Hickory sawdust in this 3-story smoke house to generate aromatic smoke for curing and smoking of hams. Gas is the ideal fuel for food processing because Gas is clean, efficient, and affords precise temperature control.



## VARIETY BAKING

Versatility of Gas and Modern Gas Equipment is evident in volume variety baking of rolls, breads, cakes, pies, etc. Precise, automatic temperature control for perfect baked goods is available with dependable Gas.



## FOOD SPECIALTIES

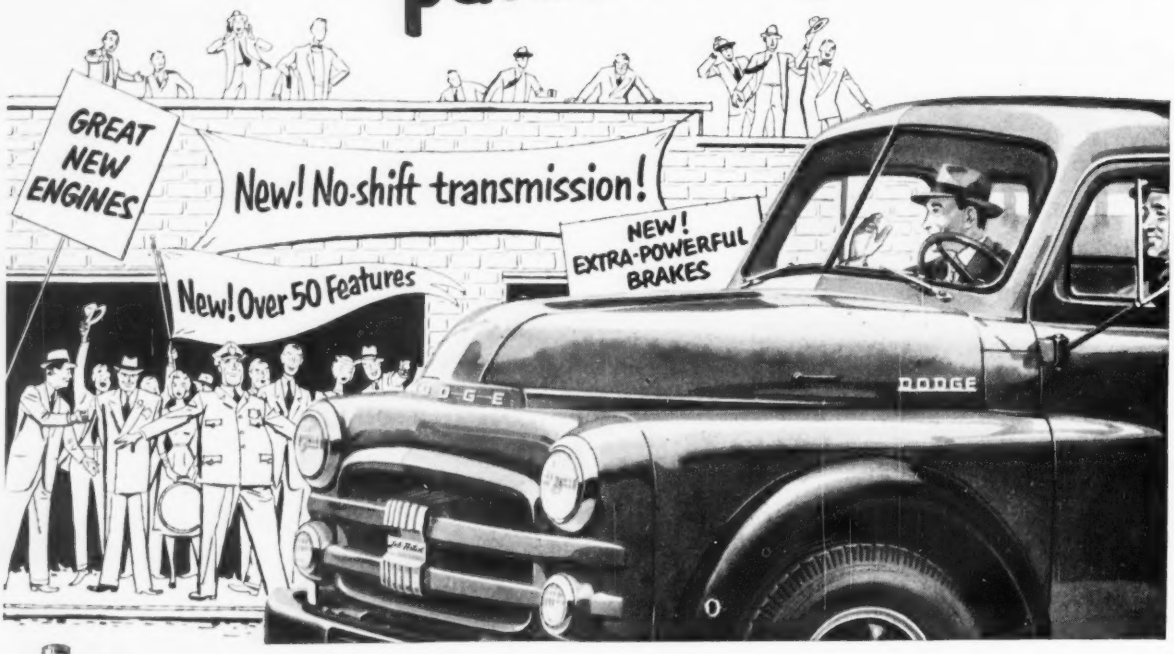
These immersion tank units used for blanching nuts are typical of the Modern Gas Equipment available for special food processing. Wherever heat is needed to process foodstuffs, you will find that Gas is the dependable, clean, economical fuel to use. Get the facts about GAS today, from your Gas Company Representative.

MORE AND MORE THE TREND IS TO GAS FOR HEAT PROCESSING OF FOODS

**AMERICAN GAS ASSOCIATION • 420 LEXINGTON AVE., NEW YORK 17, N.Y.**

# ANNOUNCING

## A new Dodge truck parade of power!



### NEW! More powerful engines!

A parade of power! See the new Dodge "*Job-Rated*" trucks at your Dodge dealer's today. A total of 7 big, rarin'-to-go engines, including 3 brand-new power plants with high compression ratios and higher horsepower, greater cooling capacity, increased displacement, twin carburetion available on larger models. Plus famous features like 4-ring pistons with chrome-plated top ring, exhaust valve seat inserts.

In addition, the new Dodge trucks offer outstanding new brakes, new no-shift transmission, and over 50 other new features. See your Dodge dealer for the biggest truck buy on record!

**For a truck, ½-ton through 4-ton that fits the job, see the NEW...**

### NEW! Extra-powerful brakes!

Stop easily on steep grades, fully loaded. Super-safe brakes give silky-smooth braking, reduced driver fatigue, greater load protection . . . new increased stopping ability on 1- through 2½-ton trucks! *PLUS* Dodge's oversize braking surface with Cyclebond linings.

### NEW! Truck-o-matic transmission!

New Truck-o-matic transmission . . . available on ½- and ¾-ton models of Dodge "*Job-Rated*" trucks . . . saves shifting, cuts driver fatigue, lets you rock out of snow, mud, sand. Only Dodge offers shift-free Truck-o-matic! *PLUS* famous gyrol Fluid Drive, to lengthen truck life, protect your load.

### NEW! Over 50 features!

50 ways new! Reinforced cab construction, improved exhaust system, extra-capacity radiators. Tinted glass, heaters with stepped-up heat output available. *PLUS* moistureproof ignition, high-torque capacity starting motors, and other dependability features. See your Dodge dealer.

## DODGE "Job-Rated" TRUCKS

*Now on display at Your Dodge Dealer's!*

# KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

## New Spice-Color Test

Greater accuracy and speed in evaluating the color of capsicum spices is reported with use of a new method.

Developed by researchers at Gentry, Div. of Consolidated Grocers Corp., Los Angeles, the new analysis is said to take only a few minutes and is reportedly much more accurate than the Lovibond method.

It is stated that the Gentry technique, which employs a photoelectric instrument—the Beckman quartz spectrophotometer – works to eliminate human error, a factor that has been common in the conventional procedure of putting an alcoholic extract of paprika, chili pepper or chili powder in long glass tubes and matching it with colored glasses.

## Softener Ban Upheld

Ban by the Federal Security Administration on use of polyoxyethylene monostearate as a bread softener was upheld late in December by the Third U. S. Circuit Court of Appeals.

F&DA's views that safety of the chemical was not adequately established and that its use creates deceptive impressions as to the bread's freshness have thus been supported by the court, according to Commissioner Charles W. Crawford.

However, exceptions to the decision have been filed by Atlas Powder Co. and Glyco Products Co., emulsifier manufacturers.

## New "Sunshine" Vitamin

A new material similar in action to vitamin D, yet soluble in either water or fats, has been discovered by two Iowa State College scientists.

Called 607, the vitamin-like material is produced by combining brucine, with sulfonated cholesterol and is prepared without ultraviolet irradiation—the method employed in production of other D-vitamins from cholesterol.

## Tomato-Shipping Tip

In shipping tomatoes, temperatures between 55 and 60 deg. F. will result in a higher quality product for eastern markets, according to preliminary results of a current study at the University of California College of Agriculture.

## Supreme Court Decision Upsets Plant Inspection by F&DA

For 14 years the Food & Drug Administration has wielded broad inspection powers under the pure food law. But the rug F&DA has been standing on has now been rudely pulled away by the Supreme Court.

In an 8-to-1 decision, the court ruled the law is too vague to support criminal prosecution against food processors who bar federal inspectors from their plants—unless they have previously granted permission to enter.

F&DA officials say their statutory obligation to protect the public health may be seriously handicapped and greatly impaired by the decision. With only 250 inspectors, the agency is charged with inspection of over 77,000 food and drug manufacturing plants and warehouses. Without the broad powers previously held by the inspectors, F&DA says enforcement of the law is impeded.

The agency already is preparing proposals to submit to Congress next year to repair the legal defect found in the law and then to restore the old powers.

The Republican and Democratic members of the House Commerce Committee which handles such legislation, are noncommittal or lukewarm about such action.

F&DA Commissioner, Charles W. Crawford, though greatly concerned about the adverse ruling, believes that most manufacturers will continue to permit inspection and will put out "clean, wholesome, truthfully labeled products" as usual. But he feels protection from the "shady fringe" has now been greatly reduced by the Court's ruling.

Justice William O. Douglas, who wrote the court's opinion, said no matter how he read the law, it does not give fair warning to a plant manager that if he fails to give permission for an inspection, he is a criminal.

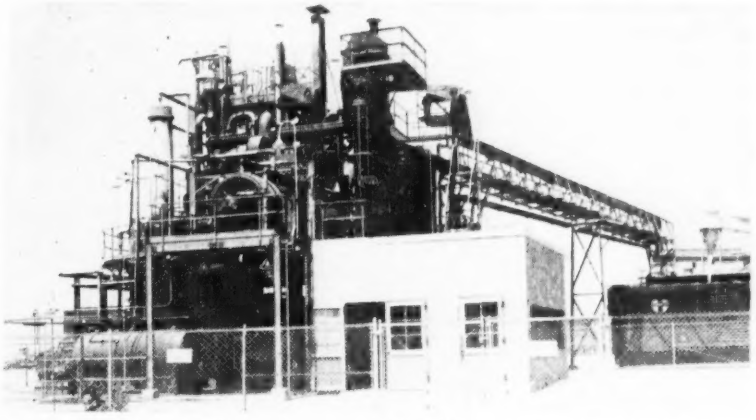
The decision upheld the Ninth Circuit Court of Appeals, which had reversed a conviction fining an apple processor for refusing to grant entry to F&DA inspectors.

**Editorial**

### *Admit the Inspectors!*

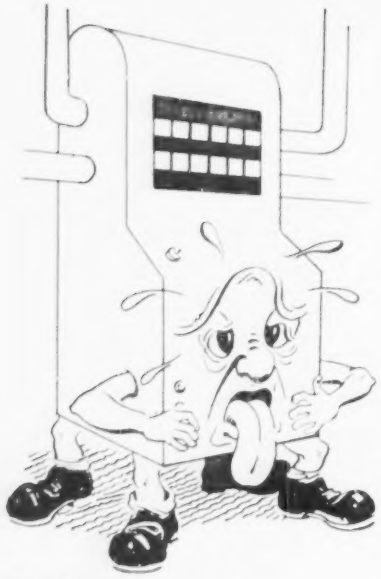
Food manufacturers have a new privilege which they should refuse to use. We refer to the right to keep Federal Food & Drug Administration inspectors off their premises—the result of the recent Supreme Court decision.

Refusal to permit inspection will



**Speeds Oil, Meal Yields**

Compact and easily operated, this new type plant for solvent extraction of prepressed cottonseed cake is now successfully producing high yields of superior oil and meal. It uses a Rotocel extractor and Blaw-Knox vapor desolventizer for turning out a bright, granular meal with a residual oil content well under the guaranteed maximum of 0.5 percent. Designed and built by the Chemical Plants Div. of Blaw-Knox Constr. Co., this facility is operated by Lubbock (Tex.) Cotton Oil Co.



**Spoiled $500 Worth Of Eggs Because of Packing Failure**

Here is a sad story, too often repeated in the food processing industry.

**Why?**

Ordinary packings are directly affected by the food acids which pass through them. Because of this they fail periodically, usually when they are processing a valuable load of perishables.

**The Answer!**

TEFLON packings and gaskets, by Chemical & Power Products Company. Contamination proof, entirely inert to all chemicals, Teflon, carefully processed by experts will continue to give good service for years.

Get the complete story of what Teflon can do for you! Send for literature today. If you have any specialized problems which you feel TEFLON can help, pass them along to our Engineering Dept.

CHEMICAL & POWER PRODUCTS, Inc.
11 Broadway, New York 4, N. Y.


be interpreted by most consumers to mean that you have something to hide, whether or not that is the case. Therefore, a refusal would harm your own business, as well as that of the food industry in general.

Keeping inspectors out could also lead F&DA to more closely examine samples of your product after they leave your plant. And if you are guilty of slipshod processing operations, you may be forced to correct them the hard way. Condemnation and seizure of quantities of valuable finished products is expensive.

Widespread denial of plant inspection undoubtedly would bring down the wrath of the zealots upon the industry. This might result in modification of the Food, Drug & Cosmetic Act in a way that the industry would not like. Could be, for instance, that the "Delaney's" will seek continuous compulsory plant inspection.

Wise processors will not take advantage of the Court ruling.—*The Editor*

## Master Brewers Reveal Innovations

Members of the Master Brewers Assn. of America traded information on new products, improved processes, and latest equipment at their recent 45th annual convention in New Orleans. Highlights are briefed below:

**Activated Carbon**—Full-scale use of activated carbon, to improve color, taste, and chill-stability and to increase yield of beers, is supported by laboratory findings and brewery trials, according to W. A. Helbig, Atlas Powder Co., and Eugene Bayerl, John Hohenadel Brewery, Inc.

A slurry made with warm water is added to the kettle just after full boiling begins. This causes the break to form more rapidly than in untreated worts, and gives an increased yield of clear wort.

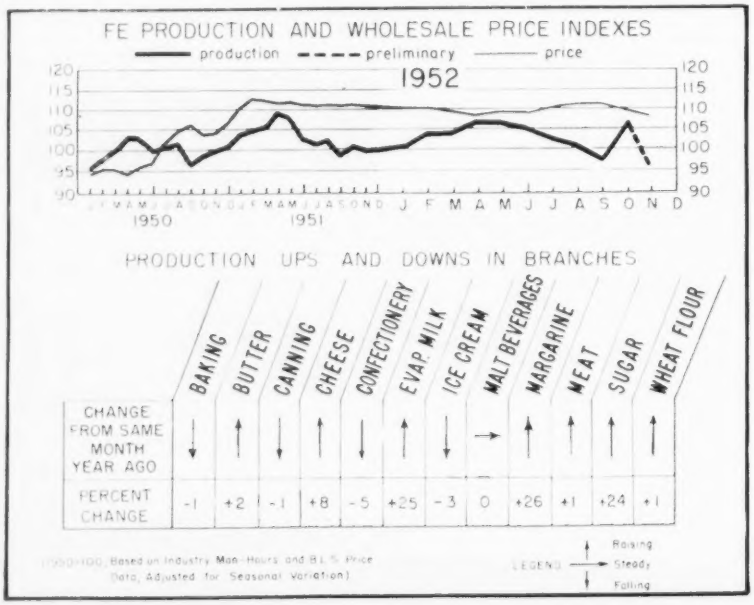
Decoloration of beer may be obtained in the cellar by addition of carbon and rousing with $CO_2$ or recirculating. Or, the carbon may be added to the diatomaceous-earth slurry when filtering.

**Inert Gas**—Substitution of inert gas for all phases where air is now used in brewery processing was suggested by Donald G. Ruff, J. E. Siebel Sons, Co., as a method for combating the oxidation problem.

This may be accomplished by adding more closed fermenters and provisions for greater $CO_2$ gas and liquid storage, or by installation and use of an inert gas generator. The latter will produce gas analyzing 12-14 percent $CO_2$ with the balance $N_2$.

**Semi-Permanent Filters**—Sheet filters if properly used will successfully process beer that has been previously filtered through diatomaceous earth, and at a saving of 50-60 percent as compared with pressed filtermasse, according to Stanley R. Parker, O'Keefe's Brewing Co., Ltd.

Best results were obtained with daily precoat of medium grade earth, which was removed by back washing each 8 hr. In this way approximately 13,000 bbl. of beer of a satisfactory quality were filtered before sheet was discarded because of reduced capacity.



**Low-Pressure Vs. High-Pressure Fillers**—The low-pressure filler can do more to keep air content of bottled beer at a minimum than any other type is the opinion of Carl E. von Czoernig, C. Schmidt & Sons, Inc. For in this unit, beer is filled through a tube fairly close to the bottom of the bottle and the only part exposed to air is a small layer called the cover.

Other advantages cited: Less counter pressure applied to filter, resulting in an escape of gas from bottles that produces a purging effect; fewer bottle explosions; and elimination of booster pump.

Stating the case for high pressure fillers, Fred Belcher, Standard Brewing Co. of Cleveland, called attention to the method of introducing beer to the filler bowl that eliminates violent foaming. Other factors stressed: Valves of high pressure unit easier to clean; filler gives higher yields; lower maintenance.

**Sanitation Program**—A bottleshop sanitation schedule should include a daily routine cleaning, a weekly cleaning, and miscellaneous cleaning is the opinion of W. E. Thiem, Sterling Brewers, Inc.

In the daily schedule performed at conclusion of day's run, fillers, pumps, and beer lines from government cellars should be thoroughly flushed, with water, then with cleaner-detergent and, finally, rinsed with fresh water. Latter should precede morning start-up.

At end of week, bottleshop equipment should be dismantled and given a thorough cleaning. Lines and pumps should be cleaned by recirculating a cleaner-detergent, followed by ball brushing and clear water flushing. Cocks should be dismantled, cleaned, and flushed.

Miscellaneous cleaning applies to items such as $CO_2$ and air lines. These should be cleaned monthly with sanitizing solutions or steam.

## Beverage Use for Naringin

Need in Sweden for a special additive to impart desired bitterness to a popular grapefruit-base beverage has now been answered by the Tempe, Ariz., juice cannery of Exchange Orange Products Co., subsidiary of the Sunkist Growers.

Some 6,000 lb. of naringin, the substance that makes citrus rind bitter, will be shipped annually from Tempe to fill the requirement. It will be derived mainly from the liquor pressed from grapefruit peel.

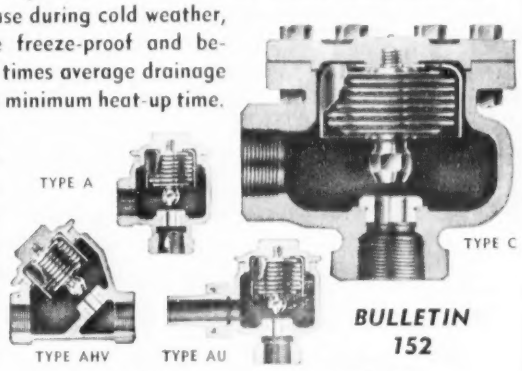
Until recently, the Swedish bottlers had been adding minute amounts of quinine to give the bitterness to their drink. But then health authorities banned this use of quinine as injurious.


NICHOLSON MAKES

**Freeze-Proof Steam Traps**

for Every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time. The non-air-binding feature of Nicholson traps also notably facilitates heat transfer in severe weather. Sizes ¼" to 2"; pressures to 250 lbs.




BULLETIN 152

193 OREGON ST., WILKES-BARRE, PA.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

Send us a sample of any stock you want to PULVERIZE

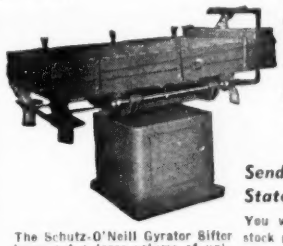
*You will receive an Engineering Report based on our Test Grind with the*

**SCHUTZ-O'NEILL PULVERIZER**

Do you have a production problem on stocks you grind, to get desired uniformity or fineness? Are you looking for increased output with a cost reducing method? Profit by Schutz-O'Neill's experience of almost 60 years in the rapid, dustless, accurate pulverizing of any dry, non-gritty, grindable stock. Your acceptance of this offer for a test grind does not obligate you. Schutz-O'Neill pulverizers are made in 6 sizes with capacities up to 3000 lbs. per hour.

Catch tramp iron or steel with a Schutz-O'Neill SUPER-MAGNET

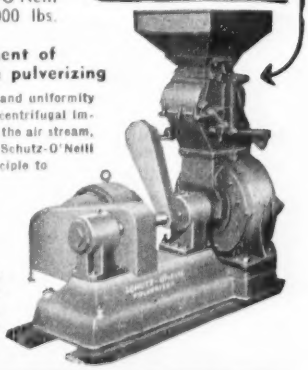
Standard equipment on feeders for Schutz-O'Neill Pulverizers.



The Schutz-O'Neill Gyrator Sifter turns out a large volume of uniform, clean products. 1 to 3 sieve frames for single or multiple separation.

**The finest development of Centrifugal air-force pulverizing**

For extremely fine grinding and uniformity of product, the principle of centrifugal impact with product carried by the air stream, has never been surpassed. Schutz-O'Neill Pulverizers utilize this principle to the fullest degree.



***Send us stock sample***
***State fineness desired***

You will receive your pulverized stock plus our Engineering Report giving recommended equipment, methods and mill plans. Literature upon request.

ESTABLISHED 1893

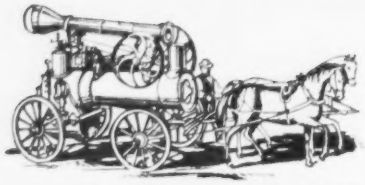
SCHUTZ-O'NEILL CO.

PULVERIZERS · BREAKER MILLS · ROLLER MILLS · BURR MILLS · HAMMER MILLS

309 Portland Ave. Minneapolis 15, Minnesota




For more information, use coupon on last page.

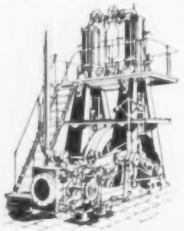


**DEMONSTRATING THE DEPENDABILITY OF**

**FRICK**

**EQUIPMENT**

The portable steam engine shown above was operated in Virginia from 1872 to 1949: the Corliss type below, built in 1891, is still running at Irwin, Penna. Another Frick Corliss, shipped in 1888, is still going strong at Weldon, N. C.



Modern Frick refrigerating machines have many advantages over the open type built in the 1880's.

Frick Company was established a century ago for making engines and farm machinery. For over 70 years it has pioneered in building refrigerating and air conditioning systems. Frick compressors commonly achieve service records of 40 years; many have run 50; some even 60!

The whole story of Frick equipment is told, with 200 illustrations, in the Centennial History just published: send $1 for your copy. And get estimates now on the cooling system you need.

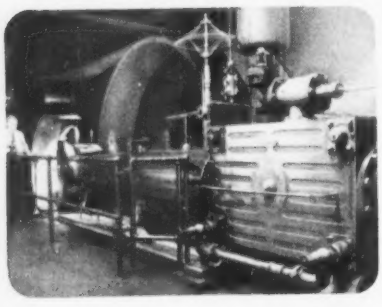
DEPENDABLE REFRIGERATION SINCE 1852

**FRICK CO.**

WAYNESBORO, PENNA., U.S.A.

*Also Builders of Power Farming and Sawmill Machinery*

450 Hp. Frick Corliss engine with 48-in. stroke at the Penn-Rillton Co., Irwin, Penna.




## More States Approving Substitute Ice Cream

"Synthetic" ice cream stepped forward in several new developments during the month in Oklahoma, Arkansas, and Indiana.

Standards for vegetable fat frozen desserts were announced in Oklahoma. These products must contain a minimum of 6 percent vegetable or animal fat and 30 percent total solids. Also, when packaged in containers larger than ½ gal., product must contain no color or flavor.

Arkansas is reported considering legislation governing vegetable fat frozen products.

And in Indiana, limited manufacture of a low butterfat frozen product was approved in a new decision by the Marion County Superior Court. It was with the provisos that the ice milk be used exclusively in the preparation of milk drinks, and that it contains no color or flavor.

## Improved Fat Rendering

Cold rendering of fats and oils is now possible by use of high frequency impulses.

The new technique is known as the Chayen Process, named after its inventor, I. H. Chayen.

Cellular material is suspended in a stream of water. It then passes through a unit in which the water is subjected to high-speed, high-frequency mechanical impulses. It is stated that cells are instantaneously ruptured and the fat is released without quality losses, which commonly result from heat or chemical extraction.

Although this method is now being employed for continuous cold degreasing of bone, trial runs indicate its successful use in a wider range of fat extraction from animals, fish, and vegetable materials. Tests are underway at British Glues & Chemicals, Ltd., London—developer of the new process—and also here in America at The Sharples Corp., Philadelphia, which will engineer it, sell, and install it.

First plant employing this process on this continent is W. Harris, Ltd., Toronto. This renderer feeds ground bones to the impulse unit at rate of 5,000 lb. hourly. Fat extraction is reported to be virtually instantaneous, with yield of a white, bland solid of high purity.

Degreased bone and fat are gravity separated. Each then passes through a series of washers and centrifuges. The fat is stored only 3 min. after the bone leaves the crusher. Degreased bone is ready for drying or gluemaking within 8 min.

"COME QUICK SOMEONE! THE CANNED SALMON IS TRAVELLING UP-BELT"

## Weigh Factors Affecting Food Laws, Protection

"Our present abundant food supply is the safest and most nutritious in history. Let us remain vigilant to avoid any decline."

With these words, Food & Drug Commissioner Crawford closed his remarks before the National Food & Nutrition Institute, meeting in Washington last month.

Previously he had stated categorically that "hazards in some degree are inherent in all progress", as an admission that efforts will be continued to improve the quantity and quality of our foods through the use of new substances.

He particularly cited three limitations in consumer protection: The food additives question, the Supreme Court decision permitting food manufacturers to deny entry to F&DA inspectors, and the lack of public knowledge as to nutritional adequacy of a normal diet—thus opening the way for quacks to sell nutritional nostrums to a gullible segment of the people.

Legislation amending the Food, Drug & Cosmetic Act of 1938 is expected by F&DA to correct the first two problems. Wider and continuing public education in the field of nutrition is Mr. Crawford's recommendation for answering the quackery.

Improved nutritive value of processed foods was discussed briefly by G. E. Hilbert, Chief of the Bureau of Agricultural & Industrial Chemistry. Trends in types of processing in recent years were outlined, and future prospects were speculated. Dr. Hilbert warned, however, that a simple answer would rarely be found to the question, "Is the nutritive value of this food better or worse because of the processing treatment it has received?"

A discussion group that considered food laws and food protection during the meeting noted the present trends in proposed legislation for food protection without offering any dissenting opinions.

## 'Flower Shipping Savings

Ways to ship double or even triple the amount of cauliflower per container—and thus offset rising crate, labor, and transportation costs—are now being indicated through research of the Western Growers Assn. working under contract with the USDA.

Closer cutting of the jacket leaves surrounding and protecting the curd is seen bearing particular promise. As conventionally packed in the one-layer #405 cauliflower crate, only about one-third of each head is edible portion.

In trial packing it was noted that trimming tops of leaves nearer to the curd top, but not cutting any more of the shank leaves, resulted in a head depth suitable for packing two layers of cauliflower in a lettuce crate. This reduced leaf weight 15 to 20 percent.

Further, trimming tops of jacket

(Turn page)

# Hors d'Oeuvres

**▶ Ike's appointment of Mrs. Oveta Culp Hobby as Federal Security Administrator is not without significance. The only urge stronger than woman's desire for security is man's eagerness to provide that security.**

▶ Eisenhower's Secretary of Agriculture, Ezra Taft Benson, has a background that makes for rare judgment on farmer-benefit plans. A high member of the Mormon Church, he undoubtedly believes in security for the individual—for those willing to work for it, that is.

**▶ Through Nutrition Foundation, food manufacturers are recommending that you refrain from over-eating. Hurting their own business? No. They want to keep you alive to eat another day.**

▶ British pubs have been serving rum, brandy, and whiskey ice cream in beer mugs. Sooner or later, someone had to come up with frozen heat.

**▶ Only 16 percent of U. S. families used frozen orange juice concentrate in 1949. By April, 1952, the figure had jumped to 63 percent.—Yet some people said that all the great food discoveries had been made.**

▶ Spheres of Edam cheese are said to have been used by Dutch Admiral De Ruyter as cannon balls in a battle with the British fleet. Just the thing for our Korean "police action."

**▶ Hormel's method of putting hogs into a carbon dioxide sleep prior to shackling and sticking achieves the ultimate. It saves the squeal.**

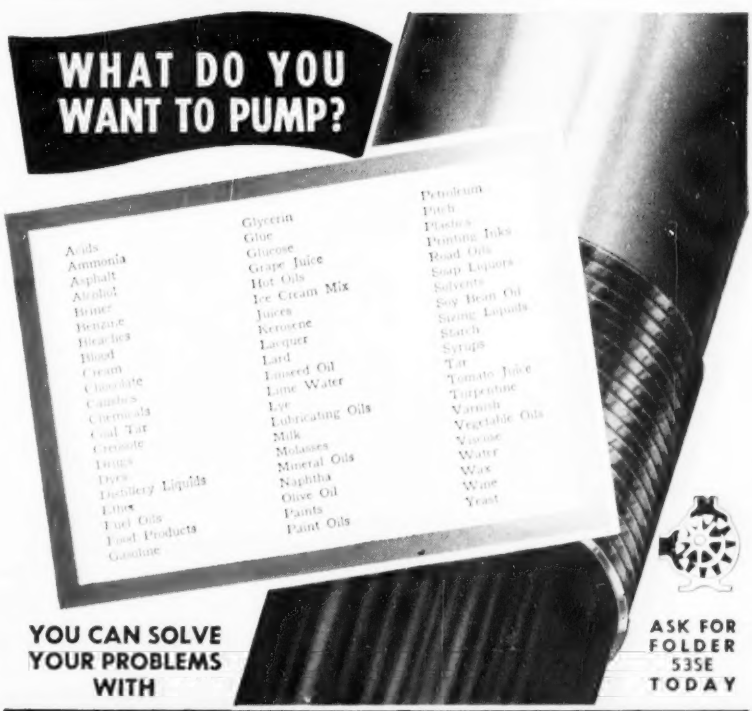
▶ Processed chicken feathers and hog hairs have value in animal feeds. And sterilized poultry manure is a source of vitamin $B_{12}$ for feed. The biological cycle is becoming perpetual.

*Whether it's canning, freezing, dehydrating,* or any other food processing operation, this rugged La Porte Flexible Steel Conveyor Belting will serve you better with lower maintenance cost.

*STEEL MESH CONSTRUCTION protects against loading impacts.* FLEXIBILITY FEATURE allows belting to gain a tighter grip on the friction drum . . . puts an end to creeping, weaving, jumping—thus, it assures a perfectly flat surface for containers, empty or filled. OPEN MESH provides circulation of air and liquids around products in process and makes cleaning faster and easier. Highly resistant to heat, cold and steam. Find out how La Porte can increase *your* food processing efficiency.

***Available in any length and practically every width.***
***Write your dealer TODAY for literature and prices!***

**LA PORTE MAT & MFG. CO.**
**BOX 124 LA PORTE, INDIANA**




**VIKING ROTARY PUMPS**
**CEDAR FALLS IOWA**
**THE ORIGINAL "GEAR-WITHIN-A-GEAR" ROTARY PUMP**




For more information, use coupon on last page.

FOAM'S A FRAUD . . .
KILL IT WITH

DOW CORNING
ANTIFOAM A

One part per million of Dow Corning Antifoam A kills foam during caustic soda concentration . . .

One part per million kills foam during synthetic varnish resin processing . . .

As little as 0.03 parts per million kills foam during tar evaporation . . .

And just three parts per million kills foam during strawberry jam concentration.

Odorless, tasteless, and relatively inert physiologically, Dow Corning Antifoam A is effective in a wider variety of foamers than any other material known—and in only trace quantities. That kind of efficiency has made it the most economical as well as the most versatile defoamer on the market.

See for Yourself

DOW CORNING SILICONES

Send COUPON Today for Your FREE SAMPLE

Dow Corning Corporation
Dept. BF-1
Midland, Michigan

Please send full information and a free sample of Dow Corning Antifoam A.

NAME
COMPANY
ADDRESS
CITY ZONE STATE

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

ATLANTA • CHICAGO • CLEVELAND • DALLAS
LOS ANGELES • NEW YORK • WASHINGTON, D.C.


leaves as close as possible to the curd top and also cutting off part of the shank gave heads that would pack three layers deep in a lettuce crate or two layers deep in a broccoli crate.

Additional tests will check the status of in-transit protection following such trimming. A slightly deeper container may further allay dangers of bruising.

## New Orange Powder

Orange powder which can be reconstituted easily has been developed at Western Regional Research Laboratory, Albany, Calif.

Products in which the powder is expected to find use, in addition to reconstituted juice itself, include ice cream and sherbets, baked goods, confectionery, and perhaps some pharmaceuticals. Because of its ease of storage and handling, the powder also offers some possibility of usefulness as a military subsistence item.

Key technical problem had been flavor stability under adverse storage conditions now achieved by a technique of in-package desiccation.

Low conversion corn syrup solids and a little sulphur dioxide are added to concentrated orange juice, the starting material in this process. Then vacuum drying follows in conventional equipment. Volatile flavors and flavor essences are absorbed in a melted sorbitol (U. S. Patent 2,566,410, Atlas Powder Co.) and after solidifying are ground and dry-mixed with the vacuum dried orange powder.

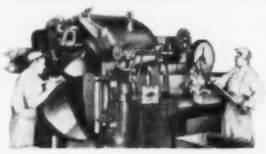
Vacu Dry Co., Oakland, Calif., has completed a development study of the process for Quartermaster Corps. Various methods of commercial production of this product, equipment needed, and estimated costs involved are expected in the company's report.

## A Word of Explanation

One of our readers has reported to us that an advertisement by FOOD ENGINEERING in the advertising trade press last October could be misinterpreted and should be clarified.

The advertisement was one of a series in which this magazine sought to demonstrate the rapid engineering progress of the food industry by reference to specific examples. In this case, our advertisement described a new pork-sausage extruding machine which eliminates the use of animal casings.

Any impression that animal casings have been made obsolete by this new development should be disregarded and we regret that this implication has been placed upon our statements.

"THIS LUBRICANT INCREASED BEARING LIFE FROM 2 WEEKS TO 2 YEARS"

—says THE GLOBE COMPANY

"Animal acids and moisture, most harmful to ball and roller bearings prevails in the entire meat packing industry. With conventional lubricants, some of the bearings in our Roto-Cut machines did not last two weeks. Since using Ball Bearing LUBRIPLATE in machines operating continuously 24 hours a day for over two years, we have not had a single bearing replacement."

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

## For Specialty Machines

Custom designed conveying and processing machinery for the food and other industries will be manufactured on a straightline production basis in Link-Belt Co.'s newly opened functional plant at Colmar, Pa.

The 330,000-sq.-ft. facility has an overall length of 880 ft., with four overhead bridge cranes in the main 32-ft. clear-height area and two in loftier bays at either end. Engineering activities are on second floor of a 240x100 office building that fronts the structure. The Austin Co. designed and built the plant.

## USDA Grade Standards

Recent actions by Production & Marketing Administration, USDA, on U. S. Grade Standards and related activities include the following:

*Swiss cheese*, revised first proposal, p. 10386, Nov. 13 *Federal Register*, written comments received until Dec. 13 (first proposal p. 12399, Dec. 8, 1951, *Federal Register*).

*Canned grapefruit*, third revision, p. 10435, Nov. 15 *Federal Register*, effective Nov. 25.

*Pineapple*, revised, proposed, p. 11123, Dec. 6 *Federal Register*, written comments received until Jan. 5.

*Canned green beans, and canned wax beans*, amendment of recommended minimum drained weights, proposed, p. 11124, Dec. 6 *Federal Register*, written comments received until Jan. 5.

*Cauliflower*, revised, p. 11137, Dec. 9 *Federal Register*, effective Dec. 14.

## F&DA Food Standards

Status of food standards of Food & Drug Administration at turn of year:

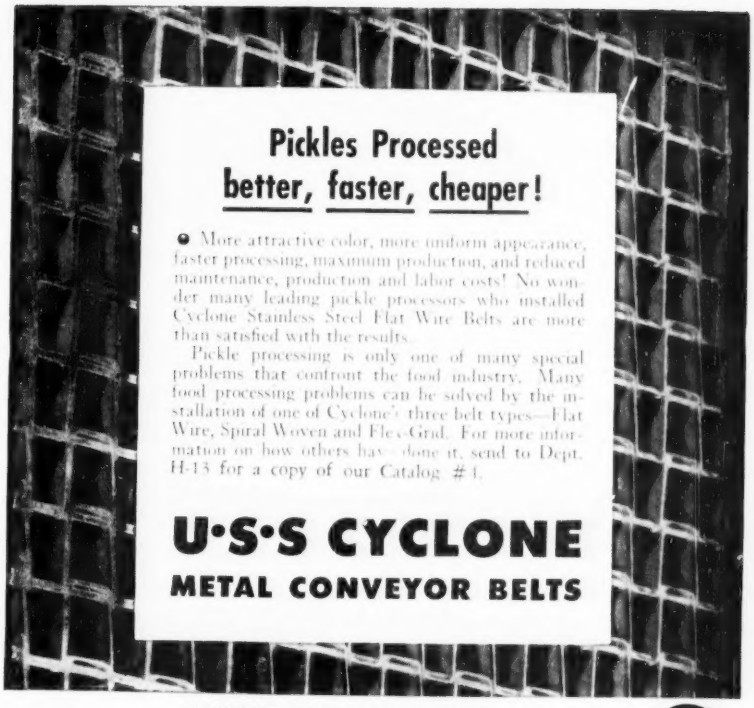
### Court Actions

*Supreme Court* has declared that Food, Drug & Cosmetic Act does not make it obligatory for a factory manager to allow entry and inspection by F&DA representatives (see separate story on p. 181).

*Bread* emulsifier decision from the Third Circuit Court of Appeals in Philadelphia (p. 181) brought filing of exceptions by two emulsifier manufacturers involved. A further petition pending in Eighth Circuit Court of Appeals is to be pressed by a third manufacturer.

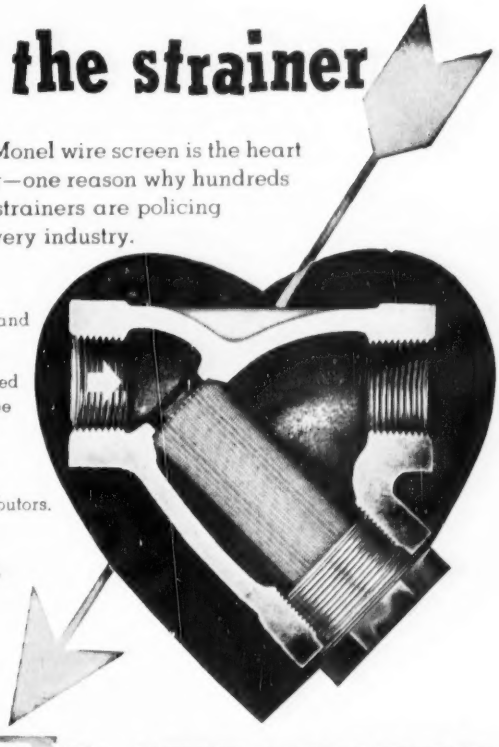
*Margarine* standard decision is still awaited in Second Circuit Court. F&DA has sought a dismissal of suit but has not yet presented its oral argument to court.

*Canned mushroom* standard was



Pickles Processed
better, faster, cheaper!
● More attractive color, more uniform appearance, faster processing, maximum production, and reduced maintenance, production and labor costs! No wonder many leading pickle processors who installed Cyclone Stainless Steel Flat Wire Belts are more than satisfied with the results.
Pickle processing is only one of many special problems that confront the food industry. Many food processing problems can be solved by the installation of one of Cyclone's three belt types—Flat Wire, Spiral Woven and Flex-Grid. For more information on how others have done it, send to Dept. H-13 for a copy of our Catalog #4.
U·S·S CYCLONE
METAL CONVEYOR BELTS
CYCLONE FENCE DEPARTMENT
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
WAUKEGAN, ILLINOIS
UNITED STATES STEEL

heart of the strainer

A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.



**OTHER REASONS—**

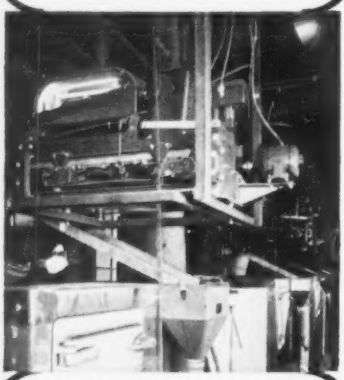
- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from 1/4" to 3"

Sold by 216 industrial distributors.
Write for Bulletin S-203.

**YARNALL-WARING CO.**
127 Mermaid Ave.
Philadelphia 18, Pa.

YARWAY STRAINERS

# HERSHEY CHOCOLATE SOLVES A FEEDING PROBLEM with W&T MERCHEN FEEDERS



W&T Merchen Feeders feeding cocoa beans to roasters at Hershey Chocolate Corporation, Hershey, Pa.

The volumetric feeders supplying the Roasting & Separation Systems at Hershey Chocolate Corporation were not compensating for density changes in the beans.

A Merchen Scale Feeder was installed in each system giving precision feeding — by weight. The precision feed made separation more efficient, and production was increased by over 10%. Hershey had planned to add additional roasting and separation facilities but the Merchen Feeders increased the efficiency of the existing systems enough to easily carry the load.

Pleased with this performance of Merchen Scale Feeders, Hershey later installed eight more feeders on their main cocoa bean blending line.

Hundreds of food and industrial plants are enjoying similar benefits from W&T Merchen Scale Feeders. Write today for information on Merchen Feeders — and how they can benefit your plant. M-20

WALLACE & TIERNAN COMPANY, INC.

NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES


taken into Second Circuit Court of Appeals on effective date, Dec. 10, on petition of K-B Products Co., Hudson, N. Y., which objected to exclusion of citric acid as an optional ingredient. Petition, however, was denied.

### Policy Statement

Simplified procedures for establishing F&DA food standards are still in the offing, according to Commissioner Crawford. Speaking in early December before National Food & Nutrition Institute, Mr. Crawford said there was a joint government-industry movement on foot to accomplish the greatest possible reduction in excessive time-consumption hearings. He pointed out that present procedures had been favored by food industry at the time the food standardization program was laid out.

In the same talk, Mr. Crawford reminded his audience that F&DA had requested a "new foods" section in Food, Drug & Cosmetic Act in order to require official F&DA approval of new or unusual food additives, whether intentional or incidental, prior to their use. It is the F&DA "expectation that a bill for this purpose will be introduced in the new Congress."

### Future Hearings

1. *Salad dressing*, rehearing, standard of identity; "skim milk and milk products" proposed as optional ingredients. F&DA gathering data; no hearing date set yet.

2. *Process cheese food*, amendment, standard of identity; skim milk cheese proposed as optional ingredient. Hearing expected soon, but date not set yet.

3. *Canned tuna*, new, hearing expected during winter but no date set yet; initiative of Administrator.

4. *Frozen vegetables*, probably only peas and asparagus at first, hearing expected late this year; initiative of Administrator.

5. *Beverages*, both still and carbonated, preliminary information being gathered by F&DA, but no date set yet; initiative of Administrator.

### Hearing in Progress

*Ice cream* standard of identity hearing moved closer to adjournment in early December when evidence on three of the four subjects announced last month (FE Dec., p. 190) was presented. However, Yami Yogurt Products did not appear to testify as expected, and Tennessee Eastman Co. withdrew its application for inclusion of "Tenox" antioxidant after part of its presentation had been made in


# SCRUBBING CORROSIVE GASES ?

Fig. 645

Are your scrubbing nozzles as efficient as you think they could be? Do they resist the corrosion or wear conditions satisfactorily — produce the breakup and distribution you would like?

Outline your spray problem for use — if your liquid can be sprayed with direct pressure at all — Monarch can furnish the nozzles.

**NOZZLES FOR:**

- OIL ATOMIZING
- HUMIDIFYING
- AIR WASHING
- DESUPERHEATING
- SPRAY PONDS
- MILK POWDERING
- ACID CHAMBERS
- CONCRETE CURING

*Write for Catalog 6-A and 6-C*

MONARCH MFG. WKS., INC.
2517 E. ONTARIO ST.
PHILADELPHIA 34, PA.

## Schedule of Events

**January**

5–31—Fundamentals of Dairy Manufacture Short Course; University of Minnesota, Minneapolis.

10–14—United States Brewers Foundation, 77th annual convention; Waldorf-Astoria Hotel, N. Y. C.

12–24—Ice Cream Plant Men's Short Course; The Pennsylvania State College, State College, Pa.

19–22—Plant Maintenance Show & Conference; Public Auditorium, Cleveland.

19–22—Annual Training School for Processors' Fieldmen; Michigan State College, East Lansing, Mich.

26–30—Statistical Quality Control Course, brewery and malting executives; Wahl-Henius Institute, Chicago.

26–30—International Heating & Ventilating Exposition; International Amphitheatre, Chicago.

29—Barley Improvement Conference, Midwest Barley Improvement Assn. and Malt Research Institute; Hotel Nicollet, Minneapolis.

**February**

9–13—Food Processing School, Food Technology Dept.; Oregon State College, Corvallis, Ore.

12–13—Western Frozen Food Processors Assn., annual meeting; Hotel Casa Del Rey, Santa Cruz, Calif.

14–17—Institute of American Poultry Industries, annual fact finding conference; Kansas City Municipal Auditorium, Kansas City, Mo.

17–20—National American Wholesale Grocers; Morrison Hotel, Chicago.

19–20—National Pickle Packers Assn., winter meeting; Sheraton Hotel, Chicago.

21–25—National Canners Assn., annual meeting (21-23); National Food Brokers Assn., annual meeting (21); Canning Machinery & Supplies Assn., annual exhibit (21-25), annual meeting (22); Conrad Hilton Hotel, Chicago.

25–26—First Annual Dairy Engineering Conference; Kellogg Center, Michigan State College, East Lansing.

27—National Transport Vehicle Show & Fleet Maintenance Exposition, 212th Regiment Armory, New York City.

the hearing. Discussion of surface-active agents resumed with data on pharmacology and other technical evidence.

### Tentative Orders Awaited

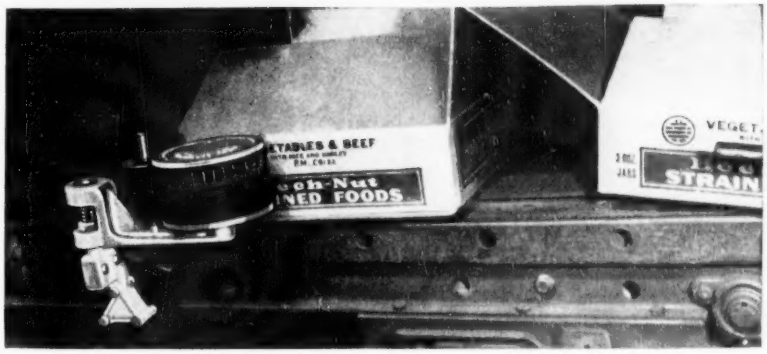
1. *Residue tolerances*, on fresh fruits and vegetables, new. Expected soon; hearing adjourned Sept. 1950; briefs filed Dec. 1950.

2. *Canned pineapple and canned pineapple juice*, new, standard of identity, quality, and fill of container. Expected in early 1953; hearing adjourned in Apr. 1952; briefs filed in September.

### Final Order Awaited

*Frozen fruits*, new, standards of identity and fill. Still expected very soon; tentative order published in Oct. 1950; exception filed in Jan. 1951.


## ▶ Eliminate Hand Labor for Marking Cases




**Gottscho ROLACODER Imprints Varieties, Brands, Code-Dates, Flavors, Lot Numbers *automatically***

Use the Gottscho ROLACODER to mark your cases and save the cost of rubber-stamping or stencilling labor. Get neater, cleaner, more accurate marking, too. The ROLACODER attaches easily to packaging or sealing machine, conveyor, etc.—marks packages automatically as they move along the line. Friction-operated, self-inking, engineered for long and efficient service. Copy changes made in minutes. Models to imprint top, sides and ends of every kind of package.

*Write for descriptive brochure ROL-2*

**ADOLPH GOTTSCHO, INC., Hillside 5, N. J.**

*Machines to MARK whatever you MAKE*

Gottscho

# THIS BOOKLET

## HELPS SOLVE YOUR FILTRATION PROBLEMS

**Your Titeflex® Filter Booklet**

is ready. Send for it now. Read about Titeflex Filters . . . their simple, foolproof construction . . . simplicity of operation . . . efficiency . . . continuous economy in use and maintenance.

**Your Titeflex Engineer**

is available, too, to consult with you on your filter problems. He'll help analyze your needs . . . select just the right equipment . . . give you the plain facts on costs.

Send the coupon today for your free copy of the Titeflex Filter Booklet—or for advice from a Titeflex Engineer. No obligation.

**BUSINESSES SERVED BY TITEFLEX FILTERS INCLUDE . . .**

Chemical — Distilling
Electroplating — Dry Cleaning
Soap — Paints & Lacquers
Cosmetics — Water
Pharmaceuticals — Food Processing
Wine — Edible Oils
Beverages — Food Extracts
Machine Tools

*Let Our Family of Products Help Yours*

Titeflex

TITEFLEX, INC.
532 Frelinghuysen Ave.
Newark 5, N. J.

MAIL COUPON TODAY

☐ Please send me a copy of your Free Booklet about Titeflex Filters.

☐ We need the advice of a Titeflex Filtration Engineer without obligation on our part.

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____


## Profits by Accounting

—Continued from page 81

out professional accounting guidance, modern business—whether large or small—is operating with blinders on. You can have accounting services tailored according to your business's needs. A small entrepreneur can have an accounting service set up a record-

keeping system which he can administer himself with occasional audits. Larger installations usually want more attention.

Whichever group you fit, one fact remains: It is management's responsibility to make certain that major decisions are based on cold, hard facts supported by cold, hard figures.

*End* (Resume reading on page 82)

## Artificial Vanilla Flavor

—Continued from page 63

rather than in water. This indicates that the synthetics may be more similar to vanilla when used in more complex foods.

This brought us to the question: "Is it possible to add a synthetic, or a combination of synthetics, to vanilla without substantial loss of the quality of the natural extract?"

If so, then the cost of such flavoring combinations would be considerably less than that of natural vanilla.

To answer this question, various combinations of natural vanilla and synthetics were evaluated in hot chocolate, frosting, and layer cake—all chosen as representative of commercial and household foods. The detailed profile data are not included, but the overall ratings are given in Table II.

Here, the first horizontal row of figures represents the number of parts of natural vanilla and synthetics used, when expressed in terms of flavor strength. For example, Formula 2


# FOR MEN WHO USE WIRE MESH BELTS!

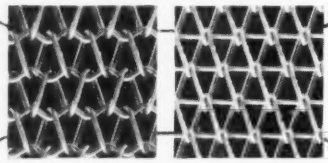
**HERE'S WHY LEADING MANUFACTURERS SPECIFY "CAMBRIDGE" WIRE MESH CONVEYOR BELTS.**

**ACCURATE CONSTRUCTION**—every step of the construction of your belt is carefully controlled so that the finished belt meets specifications for size, mesh count and mesh opening. Even the welds at the edge of the belt are specially inspected to give you maximum protection at this most vulnerable part of the belt.

**RANGE OF SPECIFICATIONS**—whether you're handling delicate lightweight loads, such as leaf crops, or heavy, bulky loads such as bagged feeds, there's a Cambridge wire belt specification to meet your needs. Even processing through heat, cold or corrosive solutions is a snap when the proper metal or alloy is chosen for fabricating your Cambridge wire mesh conveyor belt.

**EXPERIENCED ENGINEERING SERVICE**—the combination of trained engineers both in the Cambridge plant and on our Sales Staff is your assurance that the belt recommended for you is the right belt. Cambridge engineers can assist you in any phase of conveyor belt usage . . . conveyor design, plant layout, equipment specifications, etc.

**P. S.**
**IF YOU DON'T USE WIRE MESH BELTS,** you'll do well to find out how they can cut costs and boost output by combining product movement with processing in your plant. For information write direct or call in your Cambridge field engineer. Look under "Belting-Mechanical" in your classified telephone directory for the Cambridge man nearest you.



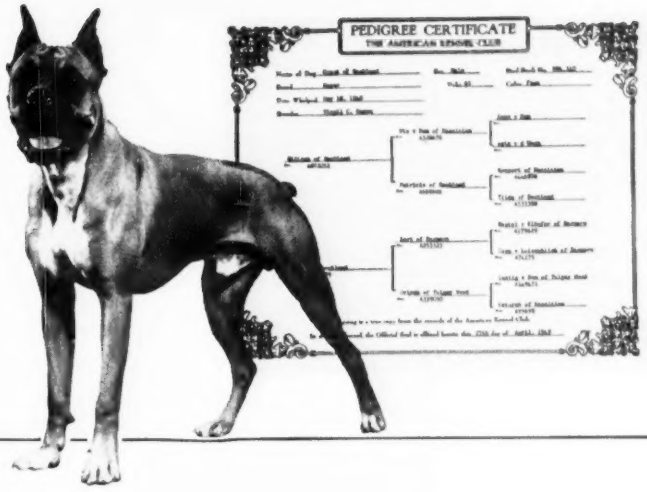
Typical Cambridge Belt Weaves, Balanced and Rod-Reinforced, are widely used for many processes which can be combined with movement. Other Weaves available.

**FREE WIRE BELT MANUAL**
Gives data on design, installations, construction. Write for your copy now.

**The Cambridge Wire Cloth Co.**
Dept. Q • Cambridge 1, Md.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL CITIES




**THE BOXER,** America's No. 1 favorite for 1949, gets his name from the fact he uses his front paws in much the same way as a human boxer when fighting. Coloring of coat ranges from fawn to brindle, but his muzzle is always black.

## Buyers Who Know

# Look at the Pedigree

THE UNION SHIELD is the pedigree mark of a box with 75 years of packaging leadership behind it.

That's why Standard Brands uses Union boxes to carry Royal Puddings—choice of millions—to dealers all over the country.

The Union shield means every step in the making, from tree to finished box, is tested and controlled by one management in America's largest integrated pulp-to-container plant.

Three modern box plants, five of the world's largest paper machines, and vast timber tracts are your guarantee of consistent quality, consistent service and fair price, today and in the future.

That's why every month more makers of famous brand products are shipping in Union boxes.

TRADE MARK
UNION

*Dependable Packaging*
*Since 1872*

# UNION Corrugated Containers

## UNION BAG & Paper Corporation

**Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.**

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

represents a blend of 50 parts of natural 1-fold vanilla extract and 50 parts of 1-fold vanillin solution. And Formula 3 is a blend of 25 parts of 1-fold vanilla extract and 75 parts of 1-fold ethyl vanillin solution.

A 1-fold vanilla extract contains flavoring ingredients from 13½ oz. of vanilla beans in 1 gal. of 35-40 percent ethanol. A 1-fold vanillin solution has 1 oz. of vanillin per gallon. Correspondingly, and by equivalent-flavor strength, 1-fold ethyl vanillin and 1-fold coumarin contain ¼ oz. of each synthetic per gallon. And 1-fold propenyl guaethol has 1/20 oz. of this flavoring compound per gallon.

The two blends—vanilla (25 parts), ethyl vanillin (75 parts); and vanilla (10 parts), propenyl guaethol (45 parts), and vanillin (45 parts)—approach a rating of 4 (excellent) in similarity of aroma and flavor to that of natural vanilla extract. In terms of flavor strength, the sample with only 10 parts of vanilla extract (Formula 4) is even slightly better than that containing 25 parts of vanilla extract (Formula 3). Formulas 2 and 5 are markedly poorer than 3 and 4.

On cost, Formula 4 is much lower than 3. Although both resemble vanilla extract very closely, Formula 4 costs only 42 percent as much as No. 3, and only 11 percent as much as vanilla extract.

Because vanilla pudding dessert is customarily flavored with synthetics, certain combinations of them were evaluated with vanilla extract. Table III shows these flavor evaluations and cost estimates. Compared with the extract, Formula 3 is rated very good. Formulas 2 and 4 were judged fair and good, respectively.

Since the level of the prices of the synthetics is low (Table III shows relatively little difference in their cost), quality can be the deciding factor.

The high-quality No. 3 blend is easily prepared by mixing 1 part (by weight) of propenyl guaethol with 20 parts of vanillin. This corresponds to the 50-50 flavor value in Table III and the 1-20 weight value in Table I.

Propenyl guaethol can be used in the preparation of extracts with a vanilla-like flavor by: (1) Combining it with vanilla and vanillin (according to the No. 4 blend in Table II) to provide a very high quality flavor, or (2) replacing a portion of vanillin (according to the No. 3 blend in Table III) to give a less expensive, but more vanilla-like flavor, than that of either vanillin or ethyl vanillin alone.

Propenyl guaethol has certain solubility limitations that must be considered in making extracts: By weight, it is 10 percent soluble in 95 percent ethanol and 4 percent in anhydrous propylene glycol. The latter—often used as an extract solvent—can be employed for any commercial "fold" strength. For example, a 1-fold strength is made by dissolving 1/20 oz. of propenyl guaethol in 1 gal. of propylene glycol. But this extract is not suitable for water-content foods.

To prepare a general purpose liquid base suitable for dilution with water, a concentrate is made of 4 percent (by weight) of the synthetic in the edible solubilizer-emulsifier Tween 80 SD.*

In making this concentrate, 1 gal. of Tween 80 SD is heated to about 150 deg. F. and 5½ oz. of propenyl guaethol is added, with stirring until it is dissolved. This 4 percent stock solution will not lose its flavor strength under normal storage conditions.

To make a 1-fold general purpose flavoring agent, 1¼ oz. of the 4 percent solution is dissolved in 1 gal. of water. This solution can be further diluted with water, since once solubilized, the guaethol compound presents no further insolubility problem.

A 1-fold high quality product corresponding to blend No. 4 in Table II, may be prepared by dissolving 14 oz. of 1-fold vanilla extract, 0.45 oz. of vanillin, and 0.56 oz. of the 4 percent Tween solution in 1 gal. of any selected extract solvent. Similarly, a 1-fold synthetic product, corresponding to blend No. 3 in Table III, may be prepared by dissolving 0.5 oz. of vanillin and 0.63 oz. of a 4 percent Tween solution in 1 gal. of any selected solvent.

The propenyl guaethol powder can be added directly into fats or essential oils. For example, in making chocolate coatings for confections, the powder is merely dissolved in melted chocolate. In most other foods (Exceptions: Those prepared as dry mixes) the 4 percent Tween solution should be used.

Examples of suitable quantities of propenyl guaethol to be used in a few commercial food products, together with estimated costs, appear in Table IV. The quantities given for vanilla ice cream correspond to blend No. 3 in Table III.

* Polyoxyethylene sorbitan mono-oleate, manufactured by Atlas Powder Co.

*End (Resume reading on page 64)*

# *Recent Inventions*

## PRODUCTS

Dry Pudding Composition Comprising Gelatinized Starch, Tetra-Alkali-Metal Pyrophosphate, and Edible Water-Soluble Calcium Salt—*M. H. Kennedy, New York and M. P. Castagna, Brooklyn to Standard Brands Inc., New York. No. 2,607,692. Aug. 19, 1952.*

Icing Composition Consisting of 54-60 Percent Sugar and 20-40 Percent Liquid Egg Whites—*H. P. Latham, Cresskill, N. J., W. E. Barch, New York, H. K. Steele, Dobbs Ferry, and L. Zukerman, Bronx, N. Y. to Standard Brands Inc., New York. No. 2,607,693. Aug. 19, 1952.*

Synergistically Sweetened Canned Fruits Made by Adding Saccharin up to 0.01 Percent and 50-500 Times This Amount of Sorbitol—*H. W. Walker, McHenry, Ill. to Ditex Foods, Inc., Chicago. No. 2,608,489. Aug. 26, 1952.*

Flavoring Material for Baked Farinacious Goods Consisting of Edible Solid Mild Flavored Organic Food Acids and Salts Thereof—*G. W. Kirby, Yonkers, N. Y. to Standard Brands Inc., New York City. No. 2,609,298. Sept. 2, 1952.*

Heat-Sterilizable, Stable Oil-In-Water Emulsion Containing Fatty Acid-Substituted Protein Hydrolyzate Emulsifier—*A. B. Storrs, Palos Heights, and J. R. Froedge, Homewood, Ill. to Armour and Co., Chicago. No. 2,609,300. Sept. 2, 1952.*

Edible Product Containing Polyglycol and Fatty Acid of Special Molecular Structure—*E. I. Valko, Mountain Lake, N. J. to E. F. Drew & Co., Inc., New York City. No. 2,610,124. Sept. 9, 1952.*

Dry Mix Including Shortening Agent Comprised of High Molecular Weight Ester of Fatty Acid and Acid Mucilaginous Emulsifying Agent—*E. B. Jaeger, Philadelphia. No. 2,611,704. Sept. 23, 1952.*

Potato Chip Construction Consisting of a Plurality of Furrows and Ridges with Spaced Perforations Between—*B. Stahmer, Omaha, Neb. No. 2,612,453. Sept. 30, 1952.*

Modifying Butter by Melting, Increasing Temperature to Boiling Point While Adding Salt, Cooling, Separating From Residue—*C. H. Bettman, Cedarhurst, N. Y. No. 2,612,454. Sept. 30, 1952.*

Cold-Mixing Food Starch Powder Made by Subjecting Inhibited Starch in Aqueous Medium to Gelatinization, Drying, Comminuting—*A. A. Halden to National Starch Products, Inc., New York. No. 2,613,150. Oct. 7, 1952.*

Enhancing Whipping Properties of Egg Albumen by Adding Small Amount of Sodium Diacetate—*S. J. Werbin to Stein Hall & Co., Inc. New York. No. 2,614,046. Oct. 14, 1952.*

Frozen Confection on Stick Consisting of Plurality of Sections With Different Weight Syrups in Each to Prevent Running—*T. W. Turner, Newport News, Va. No. 2,614,047. Oct. 14, 1952.*

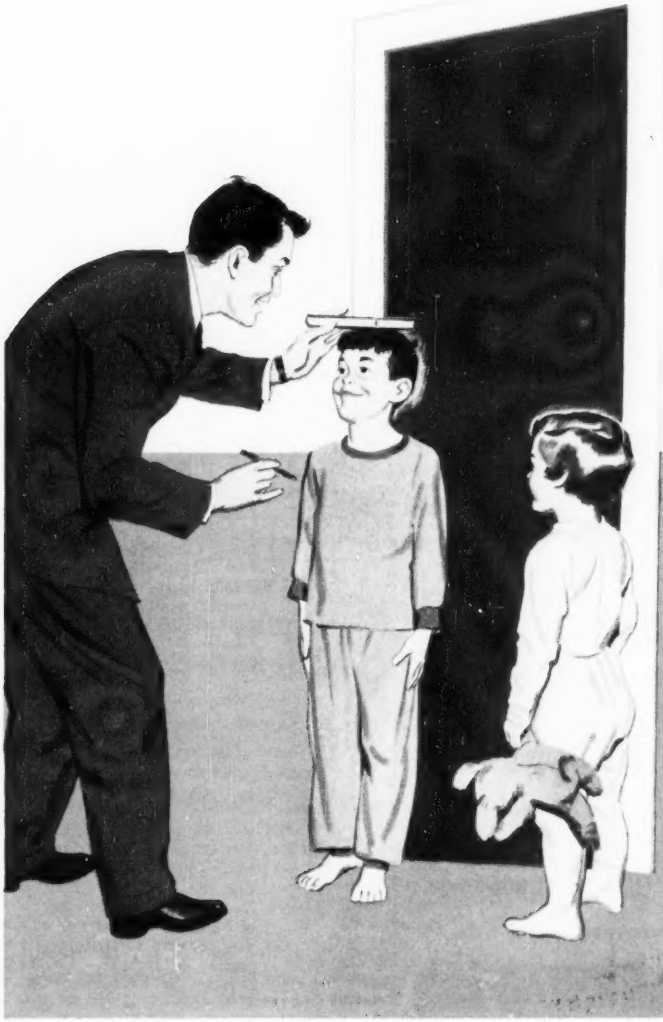
## PACKAGING

Machine for Drying and Automatically Bagging Frozen Confections—*E. Tomusko, Cleveland, Ohio. No. 2,608,329. Aug. 26, 1952.*

Machine for Evacuating and Seal-

# VITAMIN $B_{12}$

## —Helps Children with Subnormal Growth Rate



● **A new clinical study* of the effect of Vitamin $B_{12}$ on child growth provides a brilliant sales opportunity for alert food processors.**

Dr. N. C. Wetzel and associates of Cleveland, Ohio have just completed an extensive study involving 300 children. The conclusions: Vitamin $B_{12}$ exerts a growth-promoting effect when given as a dietary supplement to children with growth failure. As the results of this study become better known, more and more parents will demand foods enriched with Vitamin $B_{12}$.

Start now to investigate the possibilities of including Vitamin $B_{12}$ in your product.

Pfizer, one of the world's largest manufacturers of $B_{12}$, has worked closely with pharmaceutical manufacturers in utilizing $B_{12}$ in their products. A wealth of background material is at your disposal.

**CHAS. PFIZER & CO., INC.**
630 Flushing Ave., Brooklyn 6, N.Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.

*Wetzel, N. C. et al.: Further Studies of Vitamin $B_{12}$ Dietary Supplements, J. of Clinical Nutrition 1:17, Sept.-Oct. 1952.

**WRITE PFIZER'S TECHNICAL SERVICE DEPARTMENT TODAY FOR MORE INFORMATION ON FORTIFYING YOUR FOODS WITH VITAMIN $B_{12}$**

*Pioneers and Leading Manufacturers of Vitamins*

**Pfizer**



For more information, use coupon on last page.

## IS YOUR FOOD PRODUCT LISTED HERE?

| | | |
|---|---|---|
| | Dehydrated Soups | Ice Cream Stabilizers |
| | Dessert Mixes | Marshmallow Toppings |
| | Flavoring Emulsions | Meringues |
| Aspics | French Dressing | Milk Puddings |
| Beer | Frozen Fish | Pie Fillings (Dry) |
| Beverages | Frozen Fresh Fruit | Pumpkin Pie Filling |
| Cake Icings | Frozen Fruit Juices | Ripple Ice Cream Syrups |
| Canned Fruit | Fruit Fillings (Pie) | Sauces (Prepared) |
| Cheese Spreads | Fruit Juices | Sherbet Stabilizers |
| Chocolate Milk | Fruit Pie Fillings | Soups |
| Chocolate Syrups | (canned, ready-to-serve) | Syrups |
| Confectionery | Gas Whipped Cream | Water Gel Desserts |

## ..AND YOUR IMPROVEMENT PROBLEM HERE?

- ☐ Binding
- ☐ Bodying
- ☐ Emulsifying
- ☐ Gelling
- ☐ Modifying
- ☐ Stabilizing
- ☐ Suspending
- ☐ Thickening
- ☐ Custardizing milk & products containing milk solids
- ☐ Improving mouth-feel and flavor
- ☐ Increasing efficiency of component ingredients
- ☐ Modifying ice crystal growth
- ☐ Physical & anti-oxidant protection
- ☐ Thermally-reversible gels

## THEN YOU'LL FIND YOUR ANSWER HERE!

Are your food product and improvement problem listed above? Then follow the lead of top food manufacturers and try SeaKem "Colloids Out of the Sea".* Discover how SeaKem Products can help improve *your* food product . . . make it better . . . easier to sell.

Whether your problem is an old story or "different from anyone else's", chances are SeaKem "Colloids Out of the Sea" and Seaplant Chemical's confidential laboratory service, can mean time and money to you. Fill out and mail coupon today for prompt attention.

*SeaKem is the trademark for the standardized, water-soluble, sea plant extractives manufactured by the Seaplant Chemical Corporation. Refined by rigidly controlled processes which insure dependable uniformity and purity, SeaKem "Colloids Out of the Sea" are light amber to colorless, free-flowing flaky powders. Available in a variety of types suitable for use in an unusually wide range of food applications (see lists above), SeaKem Products have won acceptance on the basis of proven advantages with leading manufacturers and processors.

CLIP AND MAIL FOR LATEST SEAKEM TECHNICAL BULLETINS

NAME ..... TITLE .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

Type product and problem .....

Check here if you desire samples as well as technical bulletins ☐

Serving Industry with "Colloids Out of the Sea"

SEAPLANT CHEMICAL CORPORATION

63 David St., New Bedford, Massachusetts


ing Thermoplastic Containers—*J. Marzzani, Philadelphia. No. 2,608,333. Aug. 26, 1952.*

Round Bread Loaf Wrapping Machine—*B. Stein to Kostery Bakery Co., Brooklyn, N. Y. No. 2,608,811. Sept. 2, 1952.*

Machine for Bagging Cereal and Grain Including Delivery Chute, Bag Clamping Mouth, and Means for Evacuating Air From Chute Chamber When Filling—*E. Korber, Wallaceburg, Ontario, Canada to Quaker Oats Co., Chicago. No. 2,609,134. Sept. 2, 1952.*

Frankfurter Package Designed for Unopened Heating Employing Molded Aluminum Foil Sheeting—*F. W. Lindsey, Baltimore. No. 2,609,301. Sept. 2, 1952.*

Machine for Packing Buns in Cartons Employing Successively Arranged Feeding, Collecting, and Carriage Devices to Transport and Orient Product—*C. F. Johnsen, Santa Monica, Calif. and C. C. Johnsen to Roy C. Johnsen, Phoenix, Ariz. No. 2,609,645. Sept. 9, 1952.*

Turntable-Type Bottle Sorting Device Which Recognizes and Selectively Routes Bottles of Different Colors—*W. Hartig, Scotch Plains, and J. J. Smith, Fort Lee, N. J. to Pabst Brewing Co., Newark, N. J. No. 2,609,926. Sept. 9, 1952.*

**Want more information on any of these recent patents– If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25c for each copy.**

Gas Permeable Container for Storing Apples With Tight Liner of Rubber Hydrochloride Film Containing Methoxyethyl Oleate and Dibutyl Sebacate—*H. H. Plagge, Deceased by A. R. Plagge, Administratrix, ½ to Iowa State College Research Fdn., Ames, Iowa, ½ to Goodyear Tire and Rubber Co., Akron, Ohio. No. 2,611,709. Sept. 23, 1952.*

Apparatus for Packaging Frozen Fruit Juices in Endless Tube of Thermoplastic Material by Extrusion and Cross Sealing Prior to Quick Freezing in Tunnel—*G. R. Attride, Riverside, Calif. No. 2,613,488. Oct. 14, 1952.*

Container Forming Apparatus Employing Die for Forming Carton and Reciprocally Mounted Mandrel—*C. E. Palmer, Glenview, Ill. to Package Machinery Co., East Longmeadow, Mass. No. 2,614,466. Oct. 21, 1952.*

Article Orienting Mechanism for Labeling Machines—*C. F. Keil, East Peoria, Ill. to Geo. J. Meyer Mfg. Co., Cudahy, Wis. No. 2,614,681. Oct. 21, 1952.*

Leakproof Packages Made Automatically by Machine That Seals End Flaps of Tubular Carton With Heat Sealing Membrane—*R. A. Farrell, Menasha, W. G. Mueller and A. Battes, Jr., Neenah, Wis. to Marathon Corp., Rothschild, Wis. No. 2,615,377. Oct. 28, 1952.*

### PROCESSES

Selective Extraction of Citrus Juice by Sectionalizing, Then Compressing Under Progressively Increasing Pressure and Collecting Fractional Portions—*W. P. Arndt, North Hollywood, Calif. to General Foods Corp., New York City. No. 2,608,486. Aug. 26, 1952.*

Tenderizing Casings by Treatment With Ultra-Violet Light—*F. L. Kauffman, Palos Park, and W. M. Urbain, Western Springs, Ill. to Swift & Co., Chicago. No. 2,608,487. Aug. 26, 1952.*

Testing Milk by Drying Fraction of mg. of Resazurin in Sterile Vial, Then Adding Milk Sample—*N. S. Golding to State College of Washington Research Foundation, Pullman, Wash. No. 2,609,275. Sept. 2, 1952.*

Protecting Milk, Dairy Products and Margarine Against Acquired Unpleasant Taste by Adding Alkali-Treated Reducing Sugar as Protecting Agent—*C. G. Sjostrom, Almarp, Akarp, and A. V. Larsson, Linkoping, Sweden. No. 2,609,297. Sept. 2, 1952.*

Quick Cooking Rice Produced by Heating Cooked Rice in High Velocity Hot Air Stream—*R. L. Roberts, Piedmont, Calif. to U.S.A. Dept. Agr. No. 2,610,124. Sept. 9, 1952.*

Treating Rice Bran to Retard Fatty Acid Development and Stabilize Oils by Adding Alkali Metal Carbonate, Treating With Live Steam—*M. M. Cassidy, Pasadena, and H. L. B. Nawry, Houston, Texas to American Rice Growers Cooperative Assn., Lake Charles, La. No. 2,610,914. Sept. 16, 1952.*

Preparing Dried Eggs by Fermenting Liquid Egg With Yeast Incapable of Producing Reducing Sugars, Then Drying—*L. Kline, and T. F. Sonoda, Berkeley, Calif. to U.S.A. Dept. Agr. No. 2,610,918. Sept. 16, 1952.*

Non-Crystallizing Corn Sugar Made by Heat-Treating 42-47 deg. Be. Solution Under Acid Conditions Until Reducing Power of Sugars is Lowered—*J. E. Cleland, Granite City, Ill. to Union Starch & Refining, Columbus, Indiana. No. 2,610,930. Sept. 16, 1952.*

Process for Carbon Absorbing Starch Hydrolysate Solution to Isolate Polysaccharides, Separating From Slurry, Freeing Sugar by Aqueous Phenolic Washing—*F. M. Montgomery and F. B. Weakley, Peoria, H. T. Conway, Creve Coeur to U.S.A. Dept. Agr. No. 2,610,931. Sept. 16, 1952.*

Clarification of Sugar Cane Juice by Gravity Separating, Then Straining and Centrifuging Filtrate to Separate Juice From Sludge Which is Recycled—*K. H. Eakin, Park Forest, Ill. to The De Laval Separator Co., New York City.* No. 2,610,932. Sept. 16, 1952.

Quality Chips Made From Stored Potatoes by Partial Frying to Suitable Color, Then Air Drying—*C. E. Hendel, Berkeley, Calif. to U.S.A.* No. 2,611,705. Sept. 23, 1952.

## EQUIPMENT

Machine for Shelling Unwined Legumes on Conveyor Line Employing Rotary Knives—*B. C. Coons, to Food Machinery & Chemical Corp., San Jose.* No. 2,608,973. Sept. 2, 1952.

Apparatus for Removing Misaligned or Misshapen Dough Sheets From Conveyors Employing Rotating Pick-Up Drum Arranged Above Conveyor—*R. P. Steadman, to Baker Perkins, Inc., Saginaw, Mich.* No. 2,609,763. Sept. 9, 1952.

Apparatus for Moving and Dumping Hot Pans of Bread From Oven—*N. J. Nicoletti, St. Louis.* No. 2,609,944. Sept. 9, 1952.

Heater for Wort Kettles Employing Plurality of Cylinders Permitting Spiral Downward Movement of Steam—*W. Heller, Packnack Lake, N. J. to Schack, Gussner & Co., Inc., Hoboken, N. J.* No. 2,610,036. Sept. 9, 1952.

Apparatus for Preparation of Steeped Beverages With Internal Box Containing Steeping Material Fed From Surrounding Liquid in Containing Vessel Through Capillary Holes—*L. M. Pouget, Les Garennes, France.* No. 2,610,571. Sept. 9, 1952.

Machine for Depositing Candy Icing on Moving Cards—*A. W. Kreig and J. Mayer to Cypress Novelty Corp., Brooklyn, N. Y.* No. 2,610,591. Sept. 16, 1952.

Apparatus for Preparing Green Corn for Canning Employing Two Cutters to Sever Kernels From Ear, Comminuting Device in Series Which Receives a Selected Portion of Kernels—*O. C. Morral, to Morral Bros., Inc., Morral, Ohio.* No. 2,610,635. Sept. 16, 1952.

Machine for Orienting Halved Fruit Round-Side Up on Discharging Conveyor—*E. R. Dudley, Jr., Santa Clara, Calif.* No. 2,610,724. Sept. 16, 1952.

Apparatus for Continuously Treating Sugar Juice With Defecating Agent Comprising Tank With Series of Partitions With Graded Concentration of Reagent in Various Zones—*A. V. Brieghel Muller, Gentofte, Denmark to Aktieselskabet De Danske Sukkerfabrikker, Copenhagen, Denmark.* No. 2,610,929. Sept. 16, 1952.

Magnetically Actuated Sanitary Fluid Metering Device Relying on Electrical Actuation to Periodically Empty and Fill Its Hollow Measuring Chamber—*W. H. Harstick, Oak Park, and H. W. Hein, Chicago, Ill. to International Harvester Co.* No. 2,611,269. Sept. 23, 1952.

Machine for Pitting Fruits Such as Dates Employing Bucket Carrying Belt and Plunging Mechanism—*A. W. Shafer to The W. H. Marvin Co., Urbana, Ohio.* No. 2,611,403. Sept. 23, 1952.

Apparatus for Manufacturing Margarine Consisting of Homogenizing Device Which Offers Torturous Path for Product by Means of Screens and Baffles—*J. Rourke, Bebington, and W. T. Dow, Upton, England to Lever Bros. Co., Cambridge, Mass.* No. 2,611,707. Sept. 23, 1952.

Sugar Mill Employing Hydraulic Pressure Loading Cylinders, Oscillating Horizontally and Vertically to Adjust Mill to Bagasse Thickness Without Changing Pressure—*A. Bernard, Paris, France to Societe dite: Compagnie de Fives-Lille, Fives.* No. 2,612,101. Sept. 30, 1952.

Washer for Heavy Discrete Solid Materials Employing Conveyor Screw in Trough and Water Sprays—*B. C. Skinner, Dunedin, Fla. to Clinton Foods, Inc., New York.* No. 2,612,178. Sept. 30, 1952.

Weigh Can Dumping Control Employing Three Conduction Type Level Probes That Actuate Valve and Discharge Pump—*V. Schwartzkopf, La Grange, Ill. to The Lathrop-Paulson Co., Chicago.* No. 2,612,180. Sept. 30, 1952.

Liquid Mixing Unit Employing Two Communicating Chambers With Internal Rotary Mixers—*D. W. Dion, Poughkeepsie, N. Y. to The DeLaval Separator Co., New York City.* No. 2,612,354. Sept. 30, 1952.

Apparatus for Filleting Fish Employing Rotary Dorsal Length Splitting Knife and Rotary Backbone Removing Implement—*R. M. Berglund, South Bellingham, Wash. to Pacific Laboratories Inc., Bellingham.* No. 2,612,652. October 7, 1952.

Apparatus for Developing Flavor and Improving Chocolate Employing Pair of Horizontal Rolls Fed by Conveyor With Series of Chambers for Laying Mass on Rolls in Strips—*H. K. Wiemer, Wallington, England.* No. 2,612,532. Oct. 7, 1952.

Need better cleaning to meet sanitary regulations?... Put Metso to work for these results:

1. Fast removal of oil, fat, protein, albumen and solid dirt.
2. Complete rinsing.
3. Non-corrosive—prevents corrosion by other alkalies.

Use safely for manual and machine cleaning. Request *free* folder, "Cleaning in the Food Industries."

Philadelphia Quartz Company
1148 Public Ledger Bldg., Phila. 6, Pa.

METSO

**metso** *cleaners*

**FLORASYNTH**

**IMITATION SPICE OILS**

- GARLIC
- CASSIA
- CARDAMOM
- BLACK PEPPER

*and many other spice oils*

*Florasynth*

LABORATORIES, INC.
CHICAGO 6 • NEW YORK 61 • LOS ANGELES 21
DALLAS 1 · DETROIT 2 · MEMPHIS 1 · NEW ORLEANS 12
ST. LOUIS 2 · SAN BERNARDINO · SAN FRANCISCO 7
Florasynth Labs. (Canada) Ltd. Montreal Toronto Vancouver
Winnipeg Florasynth Laboratories de Mexico S.A. Mexico City

*Your Guide to*
**PROFITABLE**
**DRYING**

describes the more than 30 types of STANDARD-HERSEY DRYERS for every Process Industry need.

*Send* FOR YOUR COPY TODAY!

Examples of how Standard-Hersey Dryers make money for their operators. Special features and advantages of Standard-Hersey Dryers. Kilns, Coolers and Calciners. How our "pilot" dryer takes guesswork out of dehydrating problems. Write for Dryer Bulletin 508.

STANDARD HERSEY *Dryers*

STANDARD STEEL CORPORATION
5045 Boyle Ave., Los Angeles 58
419-45 Commonwealth Ave., Boston 15

*Metallic*
**HOW TO CONTROL CONTAMINATION**

**....Versene***

***SOLVES SOLUTION PROBLEMS***

Foods processed or packed in solution are subject to metallic ion contamination. This comes from either the solution itself or its container. It spoils flavor, appearance and quality. By controlling such contamination Versene retards rancidity, clarifies liquids, prevents "tinny" taste, increases shelf-life, helps retain natural fragrance and flavor and preserves the actual "goodness" of your product.

***COMPLIES WITH FDA PROCEDURES***

Toxicity-tested in accordance with suggested Food & Drug Administration procedures, Versene is now available to the food and beverage industries for the prevention of metallic ion contamination. In the small quantities required for this purpose, Versene is colorless, odorless, tasteless, non-toxic and safe. Versene has guaranteed uniformity of complexing power and is made only under processes originated, developed and patented by F. C. Bersworth. It is exceptionally stable at elevated temperatures and all pH's.

***VERSENE* PROTECTS QUALITY***

Versene can safeguard the quality of your products, processes and formulations against metallic ion contamination. When you suspect it in your wet-packed fruits and vegetables, jams, jellies, wines, syrups, clear sauces, oils, fats, vitamins, sea foods or essential oils — get the facts on Versene. Send for technical data. Ask for samples. Competent chemical counsel available on request. Write Dept. T

VERSENE* WATER TEST KIT. Tells total hardness in 2 minutes. Accurate to 1 gr. per gal. Versenate method. Complete with instructions $5.00 postpaid.

*Trade Mark Registered

"Chemistry's most precise chemicals"

**BERSWORTH CHEMICAL CO.**

FRAMINGHAM, MASSACHUSETTS

WAREHOUSE STOCKS
Providence Agent: George Mann & Co., Inc., 251 Fox Point Boulevard, Providence, R.I.
W. Coast Agent: Griffin Chemical Co., San Francisco, Los Angeles
Midwest Agent: Kraft Chemical Co., Inc., 917 W. 18th Street, Chicago
Wasatch Chemical Co., Salt Lake City, Utah
Southwest Agents: Barada & Page, Inc., Dallas, Houston, Kansas City, etc.
Chas S. Turner Co., 1215 Liberty Life Bldg., Charlotte, North Carolina

# Men & Companies

**K. T. Keller,** Chrysler board chairman and national director of guided missiles, is newly-elected director of National Dairy Products Corp.

## Industry

**Armour and Co.** has started construction of food distributing plant at Waterbury, Conn.

**Chase Candy Co.'s** plant, San Jose, Calif., is now property of Sierra Candy Co. Price: $300,000.

**First Spice Mixing Co., Inc.,** will shortly open a plant in Toronto, Ont. It will produce items for meat packing industry.

**Florida Fruit Canning Co.,** intends putting its Riviera Beach, Fla., plant in operation early '53. It will can tropical fruits.

**Foremost Dairies, Inc.,** has purchased five milk companies covering six Southern States. This boosts annual sales volume over $100 million.

**General Mills** plans constructing flour blending plant at Louisville, Ky.

**Laura Secord Candy Shops, Ltd.,** is currently enlarging its Montreal factory. Cost: $100,000.

**McGavin Ltd.,** baker of bread and pastry, will soon complete construction of its Grand Prairie, Alta., plant. Cost: $100,000.

**Miller Bros. Pecan Co.** is newly formed organization dealing with nuts. Capitalization: $100,000.

**Nevada Meat Packing Co., Inc.,** announces starting construction of plant near Reno. Cost: $200,000.

**Ontario Paper Co.** has begun producing synthetic vanilla from waste sulphite liquids at Thorold, Ont. Plant cost: $1,000,000.

**Oriental Foods, Inc.,** Los Angeles, is currently breaking ground for new plant at Bell Gardens, Calif.

**Seven-Up Bottling Co.,** Dallas, recently lost its plant by fire. Damage: $150,000.

**E. G. Shinner & Co., Inc.,** has been formed for purpose of meat packing. Capitalization: $500,000.

**Star-Kist, Inc.,** tuna cannery, announces completing its new Los Angeles plant. Cost: $2,000,000.

**Sun-Joy Foods, Ltd.,** had its warehouse ruined by fire at Bloomfield, Ont. Loss: $300,000.

**Sunshine Biscuit Co.** is to begin construction of plant near Columbus, Ga., shortly. Cost: $3,000,000.

**Swift & Co.** will build new plant in Kansas City replacing those inundated in '51 flood.

**Weiland Brewery,** San Jose, Calif., is now property of Falstaff Brewing Corp., St. Louis.

**Winter Garden Citrus Products Co-Operative** has completed new processing facilities at Winter Garden, Fla. Annual production: 25,000,000 gal.

## Personnel

**Dr. Max E. Bretschger** is new president of Buffalo Electro-Chemical Co., Inc., subsidiary of Food Machinery & Chemical Corp.

**W. Don Hooper** will become executive vice-president of Hunt Foods, Inc. on Feb. 1.

*Vulcanized into the Body of the Belt*

# T-CLEATS

Solves your Cleated Belt problems with 40 types of Champion Belting to handle *a variety of products*. T-Cleats cannot pull out and will flex around pulley diameters compatible with weight of Champion Belting used. As stiff or flexible as desired.

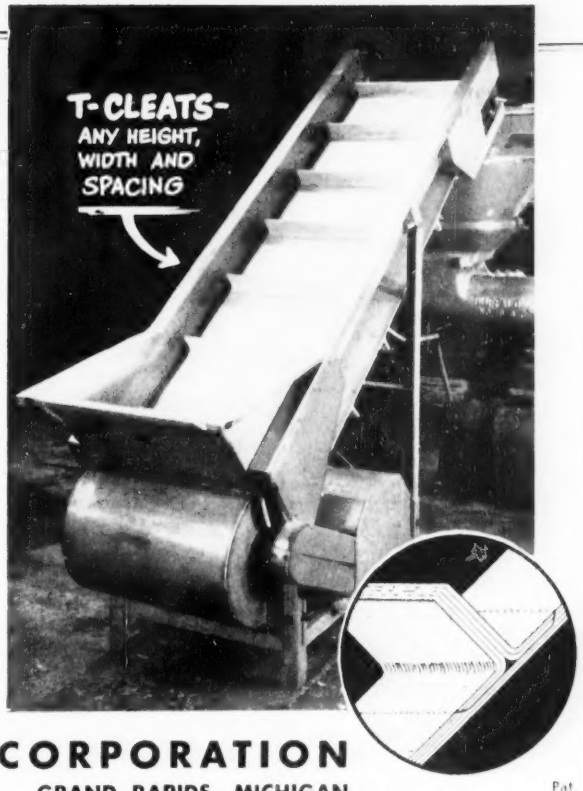
**PROMOTES SANITATION**

No gaps or crevices to collect perishable particles. No bolts, rivets or metal. Replaces bucket elevators and stainless steel belts.

**SAVES FLOOR SPACE**

Operates on an almost vertical incline. Feet of cleats follow contour of the pulleys, securely bonded together and cannot pull out.

**QUICK DELIVERY FROM OUR MODERN PLANT**




**CHAMPION BELTING CORPORATION**

**864 GRANDVILLE AVE., S. W.** **GRAND RAPIDS, MICHIGAN**

Pat. Pending

*Specialists in stainless tubing and pipe...*

**DAMASCUS TUBE COMPANY**

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA

SALES REPRESENTATIVES

PHILADELPHIA, PAUL L. FAIR
PITTSBURGH, H. W. MOLLISON
CLEVELAND, DENTON & ANDERSON CO.
CHICAGO, STEEL MILL PRODUCTS CO.
DETROIT, DENTON & ANDERSON CO.
CINCINNATI, S. E. ANNING CO.
SAN FRANCISCO, R. E. SCHLENDORF CO.

Because there is absolutely no paint odor, and it is fast-drying, new Tropilux ODORLESS oil-base flat interior paint lets you paint without interruption of business.

Work areas, hotel, motel, hospital rooms, offices, stores and restaurants lose no work time or income when Tropilux is used.

In addition, it is self-priming, has good one-coat coverage, dries free of brush marks. Use over almost any old-paint surface of walls, ceilings—on interior plaster, cement, wallboard or masonry.

Formulated for hard service, it takes plenty of hard scrubbing, actually could be washed down within 48 hours of application!

**FREE!** Your business letterhead request brings full details on Tropilux ODORLESS—formulated especially for industrial maintenance painting needs. Write today!

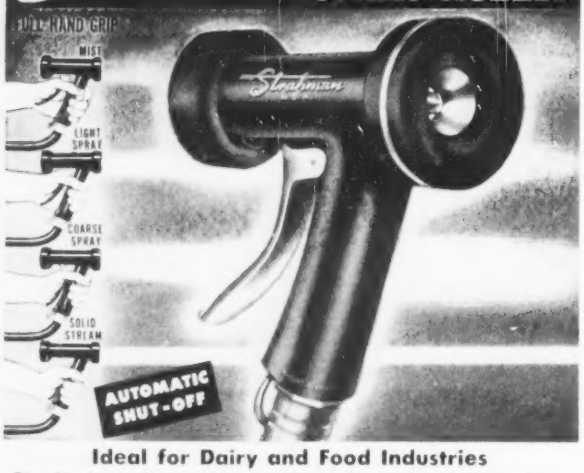
THE TROPICAL PAINT & OIL CO. 1138-1260 W. 70th, Cleveland 2, O.

**Heavy-Duty Maintenance Paints Since 1883**

TROPICAL

Subsidiary of
Parker Rust Proof Company

Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE




**Ideal for Dairy and Food Industries**

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water. *List Price $17.50*

***RENEWABLE RUBBER COVER.*** The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

*CONSULT YOUR DEALER*

STRAHMAN VALVES, INC., 16 HUDSON STREET, NEW YORK 13, U. S. A.

Dean C. H. Bailey

C. H. Bailey, dean of University of Minnesota Dept. of Agriculture, retires this month. He has served U. of M. for 40 yr.

Harold Macy

Harold Macy, successor, is noted dairy microbiologist and bacteriologist. He leaves directorship of Minnesota's Agricultural Experiment Station.

---

Donald H. Brewer has been made manager of folding carton and boxboard division, Container Corp. of America.

Arnold K. Brown is re-elected board member of National Industrial Conference Board.

Bruce D. Brown is now vice-president and general manager of Luick Dairy Co., Milwaukee.

Fred C. Brown has been made production director of Holiday Brands, Inc., Walpole, Mass.

H. Norman Davis succeeds G. A. Morris, retired, as president of Ogilvie Flour Mills Co., Ltd., Montreal.

Claude Duncan is newly-elected board chairman of Coca-Cola Ltd., Toronto.

Paul D. Eibert was recently elected president of Eibert Coffee Co., Inc., St. Paul. Lawrence J. Eibert assumes board chairmanship.

Hugh S. Ferguson is now president of Dewey & Almy Chemical Co. Bradley Dewey is board chairman.

Dr. Herbert Fineberg has been promoted to research director of Glyco Products Co., Inc.

Daniel F. Gerber is now board chairman as well as president of Gerber Products Co.

J. D. Greensward has been appointed vice-president, director of manufacturing of Allis-Chalmers Mfg. Co.'s general machinery division.

John Keiffer is now production manager of New England Baking Co., Pawtucket, R. I.

E. K. Kintner has been made a director and president of General Gasket Co., Inc., Rochester, N. Y.

Charles J. Krueck is newly-named supervising engineer of Blatz Brewing Co., Milwaukee.

Curtis E. Maier, research manager of Continental Can Co., is now also chairman of Illinois Institute of Technology's food engineering council.

George E. McDearmid was recently made a director of Libby, McNeill & Libby.

Allan M. McGavin is new president of McGavin Bakeries of Canada.

E. D. Mitchell, Asheville, N. C., has been elected president of Southern Assn. of Ice Cream Manufacturers.

Charles F. Moore is general manager of Diamond Crystal-Colonial Salt Div. of General Foods.

J. E. Perry has been made manager of Continental Can Co.'s plant at Syracuse.

J. F. Polhemus is now manager of dairy and food sales for Kelite Products, Inc., Los Angeles, maker of cleaning and sanitizing chemicals.

Wilbert G. Prasse succeeds late G. Fobian as president of Oilgear Co., Milwaukee.

George R. Pryor was recently elected president of Beverage Machinery Manufacturers' Association.

Irving C. Reynolds, president of Franklin Ice Cream Co., was elected to Ohio State Legislature Nov. 4.

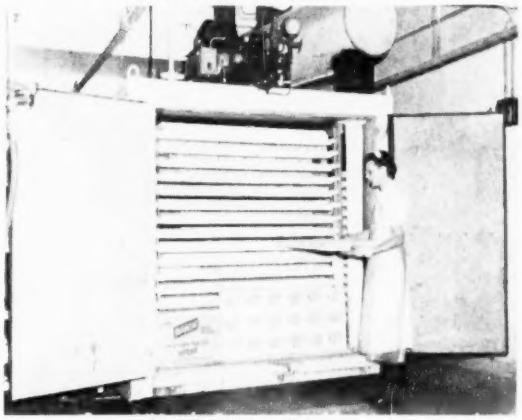
D. A. Ross is new president and general manager of Canadian Bakeries, Ltd., Calgary, Alta.

Bud E. Simonton is Chase Bag Co. superintendent at its Toledo factory.

## *Your Packaged Frozen Foods Are Processed Best with* **Amerio** CONTACT PLATE FREEZERS

(U. S. Pat. No. 2,608,069)

The faster the freeze the finer your product. Contact Plate Freezers by Amerio freeze at the same time from the top and from the bottom of your packaged product while under controlled hydraulic pressure. This process results in faster and more uniform freezing than by blast.



Under hydraulic pressure your package freezes flat for stable stacking in dispensing cabinets and has greater consumer appeal. As your plant capacity is increased with the "Amerio Unit Plan" you merely add Amerio Freezer units, which are portable and so permit flexible arrangement of your processing line.

*Check These Features*

★ COMPLETE CUSTOMER SATISFACTION

★ Full Flavor & Quality Retention
★ Minimum Freezing Time
★ Simplicity of Operation
★ Continuous High Production
★ Maximum Freezing Area
★ No Shrinkage
★ Wide Flexibility of Products
★ Minimum of Floor Space
★ Reduced Cleaning Time

★ ECONOMY—LOWER POWER CONSUMPTION PER POUND OF PRODUCT — MAINTENANCE COST NEGLIGIBLE

*Designed For Ammonia, Brine or Freon Refrigerant*

**Amerio**
**Contact Plate Freezers Inc.**
**Union City, N.J.**
*"It's the Contacts that Count"*

*Send For Illustrated Brochure*

# Cut Food Product Costs with PAYGEL

( A WHEAT STARCH )

*Write for FREE sample and verify PAYGEL savings !*

**B**etter food products at less cost, with Paygel. That's what other food processors are getting . . . and YOU can too! Prove it for yourself in your products with a free sample of this superior wheat starch. Here are just two of many examples of improvements food processors have found resulting from the use of PAYGEL:

**Salad Dressing:** PAYGEL makes possible a 5 to 7% total starch reduction and replaces a blend of starches as an ideal dressing stabilizer. PAYGEL-based dressings retain their initial body without breaking down or thinning.

**Soups:** Up to 15% less PAYGEL may be used to replace ordinary thickeners in canned soups. Has excellent flavor retention characteristics and remarkable fat dispersion properties.

**PAYGEL,** a thick-boiling starch also gives good results in pie fillings, ice cream cones, caramel confections, dessert mixes, custards, canned specialty foods. TRY IT at our expense!

**USE THIS COUPON FOR YOUR FREE SAMPLE OF PAYGEL**

GENERAL MILLS, INC., Special Commodities Div.
Minneapolis 1, Minn.

Please send me free sample, technical information and price list on General Mills' PAYGEL.

*Type of product or products* _____

*Name* _____

*Firm* _____

*Firm Address* _____

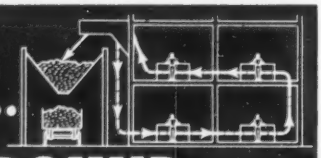
*City* _____ *State* _____

**General Mills, Inc.**
*Special Commodities Division*




For more information, use coupon on last page

upstairs...
downstairs...



ALL AROUND YOUR PLANT—
Hapman
TUBULAR CONVEYORS
can carry flowable materials at tremendous savings!

IF YOU HANDLE flowable materials similar to *any* of these PRODUCTS:

Bulk Chemicals: (Wet dry, abrasive, corrosive, radioactive)

Food: Starch, flour, malt, grain, coffee or

BY-PRODUCTS:

Metal Chips from machine tools...

Sludge from quench tanks or grinding wheels...

Coal or clay, etc.

YOU MAY REAP ENORMOUS SAVINGS—some of America's most cost-conscious firms are doing it—with plant-wide systems of Hapman Tubular Conveyors. The list of materials you can handle is almost endless. You gain great advantages, both mechanically and in terms of labor saved. The stakes are high—why not investigate now? Write today for Bulletin FE-153.

Hapman CONVEYORS, INC.
DIVISION HAPMAN-DUTTON COMPANY
KALAMAZOO MICHIGAN

**Eugene A. Hildreth** has been made a director of National Fruit Product Co., Inc., Winchester, Va., and will serve as assistant to its president.

**Richard F. V. Stanton** has been elected president of Whitney Chain Co.

**George Strietmann** succeeds A. P. Strietmann as chairman of Felber Biscuit Co. Ray L. Woerner becomes president. Felber is subsidiary of United Biscuit Co.

**Robert S. Sweeney** was made vice-president and general manager of Watson-Stillman Co. recently.

**Lowell E. Tjaden** has been appointed national sales manager for S & W Fine Foods, Inc., San Francisco.

**Lester Will**, Chicago, is new manager of American Dairy Assn.

## Associated Industry

**Aluminum Co. of America** plans building plant in Lancaster, Pa., to produce aluminum screw machine products, fasteners, rivets, and nails. Cost: $3,000,000.

**Ball Brothers Co.** has appointed J. W. Fisher director of sales for its commercial glass container division.

**Canadian Industries, Ltd.**, plans additional construction of its laboratory facilities at McMasterville, Que.

**Continental Can Co. of Canada, Ltd.**, has made James Stewart general manager of manufacturing.

**Conveyor Equipment Manufacturers Assn.** now has Harry C. Davis as its president.

**General Box Co.**, Des Plaines, Ill., has made E. J. Sommers and Allen A. Ward directors.

**Malanco, Inc.**, maker of corrugated paper products, will shortly occupy its new plant at Blue Island, Ill.

**Metco Corp.**, Dayton, Ohio, is newly-formed concern for development and manufacture of test and related equipment.

**Molded Fiberglass Tray Co.**, Linesville, Pa., has been formed to specialize in making molded glass-fiber trays and tote boxes.

**Pressed Steel Tank Co.** announces appointing Herbert E. Brumder general manager of its Downingtown Iron Works Div., Downingtown, Pa.

**Thatcher Glass Mfg. Co., Inc.**, Elmira, N. Y., elected Philip W. Hatch a vice-president recently.

## Deaths

**Frank M. Ball**, 73, director of Canners' League of Calif. —Nov. 16.

**Clarence M. Frazier**, 48, director and vice-president of Food Machinery & Chemical Corp., San José, Calif.—Nov. 10.

**Walter O. Heim**, secretary-treasurer of Barry-Wehmiller Machinery Co., St. Louis, maker of food processing machinery.—Nov. 18.

**H. Earle Kimball**, 71, president and treasurer of Cliquot Club Co., ginger ale concern. —Nov. 25.

**Charles H. G. Short**, 69, president of Lake of the Woods Milling Co., Ltd., Montreal.—Nov. 23.

**Thomas C. Thatcher**, 79, first president of General Mills' Southwestern Div.—Sept. 10.

**Edgar L. McLean**, 54, manager of Charlestown, Mass., plants for H. P. Hood & Sons. —Nov. 16.

**Paul R. Welch**, 70, board chairman of Welch Grape Juice Co.—Nov. 22.

**Joseph F. Rudolph**, president of Dodge & Olcott, Inc., passed away Nov. 23 at the age of 55.

# Just Off the Press

**New Catalogs and Bulletins**
**from manufacturers of equipment and supplies**
**— Free For The Asking —**

## Food Plant Equipment

### Dust Control Recovery

Units noted in Bulletin 800 are applicable to dust control or recovery in such processes as grinding, milling, crushing, pulverizing, and mixing. 40 pages.—*Dracco Corp., Harvard Ave. & E. 116th St., Cleveland 5.*

Circle 201A on Reader Service Card

### Various Pumps

Sump, coupled, water jacketed, and many other pumps are treated in new bulletin. 4 pages.—*Aurora Pump Co., Aurora, Ill.*

Circle 201B on Reader Service Card

### Motor Control Line

Operating performance is stressed in description of motor control line, with applications given. 4 pages.—*Arrow-Hart, Industrial Control Div., Hartford 6.*

Circle 201C on Reader Service Card

### Process Assemblies

Variety of process assemblies—autoclaves, agitators, extractors, cookers, and others—are treated in Bulletin 2403. 12 pages.—*Blaw-Knox Co., Farmers Bank Building, Pittsburgh 30.*

Circle 201D on Reader Service Card

### Heat Exchanger

Plate heat exchanger for high-temperature, short-time pasteurization and preheating and cooling is noted in recent bulletin. 4 pages.—*Knsel Dairy Equipment Co., Watertown, Wis.*

Circle 201E on Reader Service Card

### Screen Heaters

Electric screen heaters with attachment for changing screen cloth readily are topic of new pamphlet. 4 pages.—*F. R. Hannon & Sons, 1605 Waynesburg Rd. S. E., Canton 7, Ohio.*

Circle 201F on Reader Service Card

### Screw Pumps

Leaflet describes features and advantages of screw pumps. Reader is invited to send in pump problems.—*Sier-Bath Gear & Pump Co., Inc., 9252 Hudson Blvd., North Bergan, N. J.*

Circle 201G on Reader Service Card

### Frame-Type Pumps

Jobs requiring capacities to 500 gpm. and heads up to 134 ft. are accomplished with frame-type centrifugal pumps according to Bulletin 52B6691A. 4 pages.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee 1.*

Circle 201H on Reader Service Card

### Beverage Water Units

Comprehensive Bulletin 2225 gives requirements of high-quality beverage water and list units applying thereto. 12 pages.—*Permutit Co., 330 W. 42nd St., New York 36.*

Circle 201I on Reader Service Card

### Fabrication, Exchangers

Catalog features data on plate fabrication and offers analysis of heat exchanger performance and design. 20 pages.—*Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Co., Milwaukee.*

Circle 201J on Reader Service Card

### Steam and Air Traps

Bulletin 213 contains sequence of diagrams explaining operating principles and features of steam and air traps. 12 pages.—*Armstrong Machine Works, 213 Maple St., Three Rivers, Mich.*

Circle 201K on Reader Service Card

### Continuous Freezers

Material on ice cream freezers with capacities of 40 to 300 gph. at 100 percent overrun is well-presented in Bulletin G-471. 12 pages.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle 201L on Reader Service Card

### Gas Ignition Systems

*Application of Automatic Ignition Systems to Commercial Gas Cooking Equipment* gives facts pertaining thereto. 72 pages.—*American Gas Assn. Laboratories, 1032 E. 62nd St., Cleveland 3.*

Circle 201M on Reader Service Card

### Milk Bottle Washer

Milk bottle washer in 8- and 12-wide sizes turns out 40 to 100 bottles per minute, handling ½ pint to ½ gal bottles. Bulletin BW52300. 4 pages.—*Heil Co., Hillside, N. J.*

Circle 201N on Reader Service Card

### Electric Motors

Single and polyphase electric motors and their advantages comprise subject matter of recent bulletin. 4 pages.—*Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14.*

Circle 201O on Reader Service Card

Solve Your Garbage Problems with the HERLEX Food Waste Disposer

SOME PRESENT USERS*

*Pie Bakery*, for fruit waste such as apple cores, peelings, etc.

*Salad Company*, for vegetable trimmings and inedible chicken parts

*Potato Specialty Company*, for peelings, rots, etc.

*Fruit Juice Extractors, Fish Houses* and others for bones, produce waste and food preparation waste

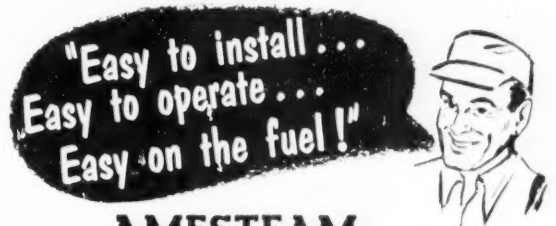
**THE HERLEX AIDS SANITATION CONTROL** by eliminating food waste in seconds as it occurs BEFORE it becomes a problem. No more need for expensive scavenger service. Designed for continuous operation—continuous feeding. Construction of wear-resistant non-corrosive aluminum alloy.

**BUILT TO THE HIGHEST STANDARDS,** the Herlex Food Waste Disposer is engineered for rigorous heavy-duty operation with compactness of size. New outstanding grinding principle results in exceptional fineness of grind for ready acceptance of waste into sewer system.

**QUIET OPERATION.** Heavy duty 5 h.p. motor. Easily installed using standard plumbing and electrical fittings. Inlet easily adaptable for conveyor funnel or other arrangement suitable for your line.

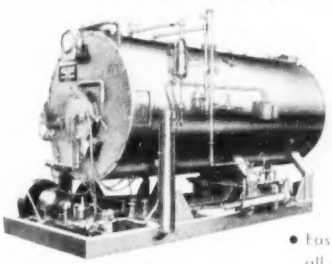
* Names on request.

**HERLEX MANUFACTURING COMPANY** 1444 W. Van Buren St. Chicago 7, Ill.



"Easy to install . . . Easy to operate . . . Easy on the fuel!"

AMESTEAM GENERATOR



- A complete unit, piped and wired, ready for service connections.
- Needs no special foundation or expensive stack.
- Fully automatic . . . attention free.
- 80% efficiency means real fuel savings.
- Easy to clean and service . . . all parts accessible.

20 SIZES — 10 to 600 h.p. — 15 to 200# OIL OR GAS

FREE BULLETIN!
WRITE FOR YOUR COPY

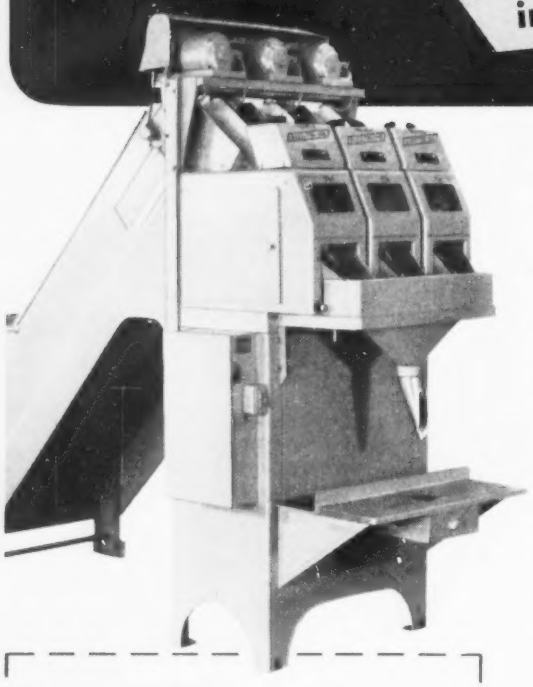
Complete engineering facts on the exact AMESTEAM GENERATOR to do your job and save you money. Write today!

**AMES IRON WORKS**

BOX C-13 OSWEGO, N. Y.

# Accuracy!

**it's GUARANTEED with newly improved Elec-Tri-Pak Fillers**



## Reduces product and packaging costs

When you fill *accurately* you package profitably. You have no costly underweight or overweight problems . . . no short-fill or product give-away worries. You reduce costly, troublesome stop-and-start operations.

Triangle guarantees not only filling *accuracy* but also *speed*. That means operating efficiency to meet your exact requirements—with lower labor costs too.

***What makes this possible?***

New features and engineering developments make the Elec-Tri-Pak your preferred filling equipment.

*Mono-Matic Scale*—gives you guaranteed accuracies to plus or minus 1/64 ounce. Acro-meter scale adjustment makes operation simple and automatic.

*Controlled Action Balance Beam*—holds scale absolutely steady—no jiggling or teeter-totter disturbances.

*Vibralectric Feed Control*—for even, gentle flow of products from feed tray onto scales. Trays designed expressly for your product . . . speed of feeding action adjusted to meet exact requirements.

These features are yours only with Triangle Elec-Tri-Paks. Get all the facts for *your* operation *soon*.

**If you package**

- Beans, peas, rice
- Macaroni, noodles
- Coffee, tea
- Candy, confections
- Cookies, crackers
- Potato chips, pretzels
- Sugar, salt
- Feeds, seeds
- Fertilizers, chemicals
- Soaps, detergents

**. . . there's an efficient Elec-Tri-Pak for you!**

**Use this coupon for prompt action**

Triangle Package Machinery Company
6637 West Diversey Blvd., Chicago 35, Ill.

*Gentlemen:* I'd like to know more about your newly improved Elec-Tri-Pak Filler . . . without obligation.

Name_____

Company_____

St. Address_____

City_____

Zone_____ State_____

Products packaged_____

**Use this coupon for prompt action.**

**TRIANGLE PACKAGE MACHINERY CO.**

**6637 West Diversey Blvd., Chicago 35, Ill.**

Sales Offices: New York, Newark, Baltimore, Boston, Atlanta, Dallas, Denver, Los Angeles, Portland, Ore., Montreal, Mexico City

### Drives, Speed Reducers

Worm gear drives and speed reducers are cited with relation to performance. 8 pages.—*Cleveland Worm & Gear Co.*, 3249-59 E. 80th St., Cleveland 4.

Circle 203A on Reader Service Card

### Heater Units

Vertical and horizontal shaft units for heating are given replete coverage in Bulletin 3570. 48 pages.—*American Air Filter Co., Inc.*, Louisville, Ky.

Circle 203B on Reader Service Card

## Control Equipment

### Flavoring Materials

New catalog extensively covers flavoring, aromatic, and essential oil materials offered to food and allied fields. 28 pages.—*Florasynth Laboratories, Inc.*, 1513-1533 Olmstead Ave., New York 61.

Circle 203C on Reader Service Card

### Flow Indicators

Line of flow indicators for revealing path of liquids, gases, vapors, slurry, or sludge, is detailed in Bulletin 18-W. 12 pages.—*Schutte & Koerting Co.*, Cornwells Heights, Bucks County, Pa.

Circle 203D on Reader Service Card

### Burners Safeguarded

Combustion safeguards for multiple oil or gas burners are attained via use of systems described in Bulletin 9603. 4 pages.—*Minneapolis Honeywell Regulator Co., Brown Instruments Div.*, Wayne & Windrim Aves., Philadelphia 44.

Circle 203E on Reader Service Card

### X-Ray Tools

Three x-ray tools for non-destructive analysis are diagrammed and application studies given in new booklet. 8 pages.—*Research & Control Instruments Div., N. American Philips Co., Inc.*, 750 S. Fulton Ave., Mount Vernon, N. Y.

Circle 203F on Reader Service Card

### Electric Eyes

Electronic instruments — electric eyes—for instant monitoring of process flows are given leaflet treatment.—*ESS Instrument Co.*, 96 S. Washington Ave., Bergenfield, N. J.

Circle 203G on Reader Service Card

### Pneumatic Controller

Catalog C-50 discusses pneumatic controller for rate of flow, differential pressure, liquid level, viscosity, pressure, and temperature applications. 20 pages.—*Fisher & Porter Co.*, Hatboro, Pa.

Circle 203H on Reader Service Card

### pH Meter

Portable pH meter using three batteries is described in Leaflet 118.—*Photovolt Corp.*, 95 Madison Ave., New York 16.

Circle 203I on Reader Service Card

### Dust Filters

Approach to dust control problems is given in connection with description of dust filters in Bulletin 528. 16 pages.—*Day Co.*, 810 3rd. Ave., Minneapolis 13.

Circle 203J on Reader Service Card

### Test Chambers

Five basic chambers for temperature-humidity tests treated in leaflet.—*Tenney Engineering, Inc.*, 26 Ave B, Newark 5.

Circle 203K on Reader Service Card

### Temperature Recorder

Details on temperature recorder, showing how parts, from bulb to chart, contribute to recorder accuracy, are available in Bulletin 447. 20 pages.—*Foxboro Co.*, Foxboro, Mass.

Circle 203L on Reader Service Card

### Vacuum Filters

Full line of ceramic vacuum filters is carried in Bulletin 37. 8 pages.—*U. S. Stoneware Co.*, Akron, Ohio.

Circle 203M on Reader Service Card

### Speed Changers

Miniature fixed-ratio speed changers for gearing problems in instruments, servomechanisms, controls, regulators, etc., are discussed in Bulletin 100. 4 pages.—*Metron Instrument Co.*, 432 Lincoln St., Denver 9.

Circle 203N on Reader Service Card

### Liquid Scale

Automatic gravity-operated liquid scale is given full coverage in Bulletin 5204.—*Richardson Scale Co.*, Clifton, N. J.

Circle 203O on Reader Service Card

## Materials Handling

### Meat Apparatus

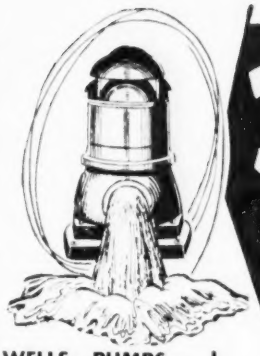
Well-illustrated Catalog 68-A presents host of trucks, racks, buckets, stands, and additional units for meat industry use. 32 pages.—*Allbright Nell Co.*, 5323 S. Western Blvd., Chicago 9.

Circle 203P on Reader Service Card

### Sealer, Labeler

Leaflet briefly discloses information on manually operated polyethylene or pliofilm bag sealer and labeler.—*Mercury Heat Sealing Equipment Co.*, 331 N. 11th St., Philadelphia 7.

Circle 203Q on Reader Service Card

**Built Right**

**WELLS, PUMPS— COMPLETE WATER SUPPLY UNITS**

**TO PERFORM RIGHT**

Layne's services include the location of, and drilling to adequate supplies of ground water for any use where production cost must be extremely low. Layne uses highly specialized engineering methods gained through years of world-wide experience. Wells are made in whatever size needed to meet the water supply requirements. The depth is as necessary to reach adequate water bearing formations. The finished job is beyond compare with any other. For water well and deep well pump catalogs, address Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

**LAYNE & BOWLER, INC.**
General Offices, Memphis 8, Tenn.

Layne
**WATER WELLS**
**VERTICAL TURBINE PUMPS**
**WATER TREATMENT**

**NATURAL SPICES CONTAIN ALL THE FLAVOR!**

In natural spice seasonings you get the full flavor of spices, because the natural balance of the spice is completely unaltered. Every flavor-producing factor of the original spice is present, including volatile oils, oleoresins, water soluble materials, natural starches and sugars—all held and protected by natural spice cells and fibers. You get natural flavor, and *all* the flavor with natural spices!

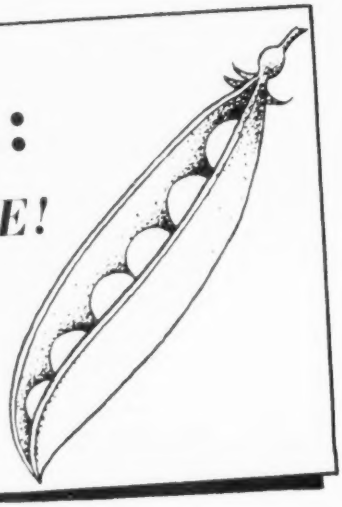
**AMERICAN SPICE TRADE ASSOCIATION**
82 WALL STREET
NEW YORK 5, N. Y.



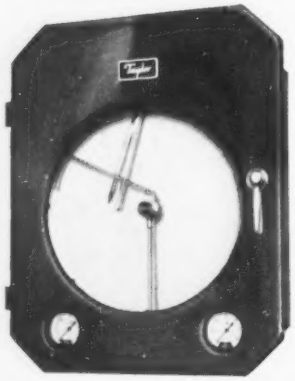

For more information, use coupon on last page.

# Famous Fallacies:

## *that Peas in a Pod are ALIKE!*



**ANSWER:** Like a family of children, they vary in both size and quality. To grade them properly you need a Taylor Brine Density Control System on your pea grader*.



## TAYLOR CONTROL GRADES PEAS AUTOMATICALLY BY REGULATING BRINE DENSITY!

YOUR grader equipped with this system, will grade peas efficiently and economically by the flotation principle. With this system the density of the brine is measured in a Sight Feed Bubbler by means of a Taylor High Accuracy Mercury Manometer. Any change in brine density in the grader is quickly detected and the Recording Controller opens *brine* or *water* valves to return it to the correct value.

**Completely automatic** control is obtained by the use of two throttling type control valves on the brine and water lines, both operated by the same Controller, but staggered so that only one can be opened at a time. Thus brine density can be *diluted* as well as *increased* as required, by simply adjusting the controller set point.

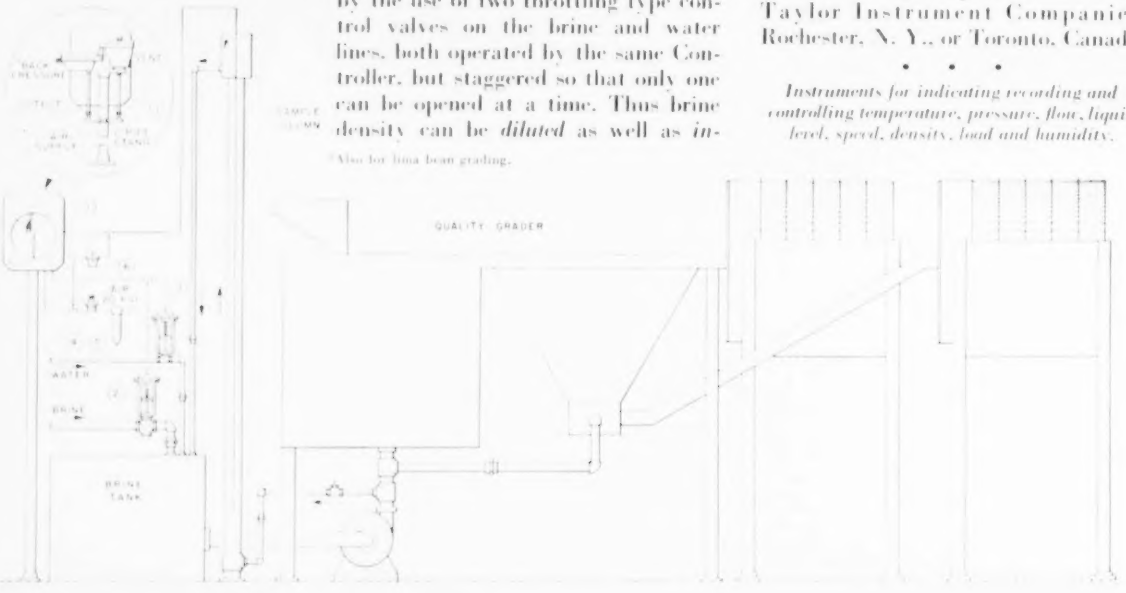
**RESULTS: 1.** The maximum yield of top quality peas — continuously and automatically. **2.** Salt consumption reduced to minimum requirement.

**There is a Taylor Control System** to help you cut costs and improve quality and efficiency in many phases of the food industry. Why not call in your qualified Taylor Field Engineer for specific information on your problem — or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

• • •

*Instruments for indicating recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

*Also for lima bean grading.




**TAYLOR INSTRUMENTS MEAN ACCURACY FIRST**

### Trucks, Cranes

Fork, ram, platform, and crane trucks are detailed with specifications in Catalog 54. 8 pages.—*Baker-Raulang Co., 1260 W. 80th St., Cleveland 2.*

Circle 205A on Reader Service Card

### Storage Racks

Pictoral treatment is given storage racks for drums, barrels, crates, bins, skids, and pallets in Bulletin 5221. 12 pages.—*Barrett-Cravens Co., 4613 S. Western Blvd., Chicago 9.*

Circle 205B on Reader Service Card

### Refrigerated Bodies

Insulated and refrigerated truck bodies for delivery of milk, ice cream, meat and other perishable products are depicted in colorful catalog. 24 pages.—*Herman Body Co., 4400 Clayton Ave., St. Louis 10.*

Circle 205C on Reader Service Card

## Free Literature—Fast Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard inside the back cover. Then sign at the bottom and mail. No postage is required.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

### Stacking Units

Numerous units for stacking and moving materials are discussed in Vol. VI, No. 3 of *The Lever*. 16 pages.—*Lewis-Shepard Products Inc., 245 Walnut St., Watertown, Mass.*

Circle 205D on Reader Service Card

## Plant Supplies

### Tooth-Sprocket Wheels

Available from stock are 207 cast tooth-sprocket wheels, listed in descriptive Bulletin 2467. 8 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 205E on Reader Service Card

### Anent Insulation

Catalog denotes insulation materials with temperature range from —150 to 1,800 deg. F. 20 pages.—*Baldwin-Hill Co., 1203 Breunig Ave., Trenton, N. J.*

Circle 205F on Reader Service Card

### Multi-Purpose Hose

Five hose types, color-coded, for multi-purposes are specified in recent bulletin. 8 pages.—*Thermoid Co., Trenton, N. J.*

Circle 205G on Reader Service Card

### Floor Machines

Upkeep of floors, rugs, or carpets is stated enhanced via use of floor machines depicted in new bulletin. 4 pages.—*Hild Floor Machine Co., 740 W. Washington Blvd., Chicago 6.*

Circle 205H on Reader Service Card

### Belt Lacing

Leaflet A-70 lists conveyor belt lacing for joining belts with widths to 96 in.—*Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44.*

Circle 205I on Reader Service Card

### Chemical in Food

Toxicity of sequestrene as related to food processing is given full coverage in comprehensive catalog. 54 pages.—*Alrose Chemical Co., Providence, R. I.*

Circle 205J on Reader Service Card

### Cleaning Procedures

In-place cleaning procedures via recirculation methods comprise subject of booklet. 11 pages.—*Klenzade Products, Inc., Beloit, Wis.*

Circle 205K on Reader Service Card

### Welding, Cutting Tools

Flame cutting, heating and welding tools are billed in pocket-sized Bulletin 330. 18 pages.—*Victor Equipment Co., 844 Folsom St., San Francisco 7.*

Circle 205L on Reader Service Card

### Rubber Coatings

Anti-abrasion and corrosion are acclaimed features of plastic rubber coatings noted in bulletin.—*Magic Chemical Co., 121 Crescent St., Brockton, Mass.*

Circle 205M on Reader Service Card

### Insulation Wool

Briefly discussed via leaflet are applications and properties of specific insulation wool.—*Pacific Lumber Co., 100 Bush St., San Francisco 4.*

Circle 205N on Reader Service Card

### Aluminum Manual

*How Aluminum Can Save Tin* is new well-documented manual. 52 pages.—*Reynolds Metals Co., Louisville, Ky.*

Circle 205O on Reader Service Card

### Pressure-Sensitive Tapes

Revealing how pressure-sensitive tapes are used in holding and bundling tasks is function of new bulletin. 8 pages.—*Minnesota Mining & Mfg. Co., St. Paul, Minn.*

Circle 205P on Reader Service Card

MORE THAN 80 YEARS OF CONTINUOUS SERVICE AND PROGRESS

**CENTRAL FIBRE PRODUCTS CO., INC.**

General Office, Quincy, Illinois, Telephone 8700

FOR EFFECTIVE SPRAYING AT LOWER COST

*remember final control is the SPRAY NOZZLE you use!*

In design . . . choose the Spray Nozzles that give you proper performance, with exact spray pattern, impact, spray angle and capacity. In application . . . be sure the nozzles as supplied are produced to close tolerances. Metallurgically, make certain the spray nozzles fit your use.

With Spraying Systems you can be sure of spray nozzles to meet all three requirements. *Let Spraying Systems Co. recommend Spray Nozzles to meet your needs best.*

YOUR GUIDE TO SPRAY NOZZLE SELECTION

Spraying Systems Co. Catalog No. 22 . . . 32 pages, with complete performance data. Also write for Catalog 23 . . . Pneumatic Atomizing Nozzles.

**SPRAYING SYSTEMS CO.**

3212 RANDOLPH STREET • BELLWOOD, ILLINOIS

FOR EFFICIENT SPRAYING MAKE SURE THE NOZZLE IS RIGHT

# *Get the facts straight about*

# TIN

Tin is vital to the free world . . . indispensable to this nation's health, industrial progress, transportation, communications, standard of living, and security.

Tinplate, for example, is strong, can be soldered easily, can be lacquered and lithographed beautifully, and is absolutely nontoxic. In solder, tin wets metals readily, flows easily, and seals sound joints. Tin resists corrosion, too, and is highly malleable.

Yet we continue to seek substitutes for tin . . . continue to strive for that elusive something "just as good."

WHY?

Does it make sense to try to replace one of the most economical production metals known to industry?

Does it make sense when Malaya, the world's largest tin producer and one of the free world's stanchest allies, stands ready to supply tin on a free market for whatever the demands of American industry may be?

It is the purpose of this Bureau to furnish accurate information about tin to American industry, and to promote a clearer understanding between the United States and Malaya.

One of the media used to accomplish this is a monthly newsletter. We'd like to send "Tin News" to you regularly, and with our compliments. All you need do is tell us you'd like to get it.

## THE MALAYAN TIN BUREAU

**Department 261**

**1028 Connecticut Avenue, Washington 6, D.C.**

**MALAYAN**

**BUREAU**

**THERE IS NO REAL SUBSTITUTE FOR TIN**

### Floor Cleaning Units

Mop wringers, buckets, and other units, are tabulated in Bulletin 251-2 on floor-cleaning equipment units. 2 pages—*Geerpres Wringer, Inc., Box 658, Muskegon, Mich.*

Circle 207A on Reader Service Card

### Protective Grout

Acid-resisting and non-shrinking features of protective material for grouting tile and related joints are presented in leaflet.—*A. C. Horn Co., Inc., Long Island City 1, N. Y.*

Circle 207B on Reader Service Card

### Resistance Chart

Chemical resistance chart describing protective coating products is now obtainable. 4 pages.—*David E. Long Corp., 220 E. 42nd St., New York 17.*

Circle 207C on Reader Service Card

### Flexible Tubing

Available in sections up to 30 in., flexible tubing described in Catalog C2-3 is noted as lightweight with lasting qualities. 4 pages.—*Flexible Tubing Corp., Guilford, Conn.*

Circle 207D on Reader Service Card

### Electronic Tool

Portable electronic instrument designed to locate trouble sources in equipment, is discussed in bulletin. 4 pages.—*Anco Instrument Div., American Name Plate & Mfg. Co., 4254 W. Arthington St., Chicago 24.*

Circle 207E on Reader Service Card

### Tile Tanks, Chests

Glazed tile tanks and chests, and their uses and advantages, are subject of bulletin. 8 pages.—*Kalamazoo Tank & Silo Co., Kalamazoo, Mich.*

Circle 207F on Reader Service Card

### Foil Containers

Pie plates, trays, boxes and cups of foil type are pictured with specifications in latest release. 4 pages.—*Foil Kraft, Inc., 3517 San Fernando Rd., Los Angeles 65.*

Circle 207G on Reader Service Card

### Paper Bags

Five types of paper bags—sewn open mouth, sewn valve, pasted open mouth, pasted valve, and automatic or self-opening sack—are illustrated in detail in Catalog BH, 12 pages.—*Bagpak Div., International Paper Co., 220 E. 42nd St., New York 17.*

Circle 207H on Reader Service Card

### Resin, Bearing Material

Polytetrafluoroethylene resin, also an oilless plastic bearing material, are discussed in new release. 6 pages.—*Dixon Lubricating Saddle Co., Bristol, R. I.*

Circle 207I on Reader Service Card

## Miscellaneous

### Packaging Pointers

Steps involved in contemplating new package or re-designing old one are outlined in booklet on packaging pointers. 16 pages.—*W. C. Ritchie & Co., 8802 Baltimore Ave., Chicago.*

Circle 207J on Reader Service Card

### Corn Applications

Work titled *Corn in Industry* gives specific applications of corn kernel with material attractively presented. 64 pages.—*Corn Industries Research Foundation, 3 E. 45th St., New York 17.*

Circle 207K on Reader Service Card

### Embezzlement Controls

Function of booklet is to outline embezzlement controls for prevention of employee fraud. 28 pages.—*Public Service Dept., Fidelity & Deposit Co., Baltimore 3, Md.*

Circle 207L on Reader Service Card

### Gas Combustion

*Heat in Harness* features story of gas combustion and correlated growth of industry. 42 pages.—*Surface Combustion Corp., Toledo 1.*

Circle 207M on Reader Service Card

### Canning Picture

Broad picture of canning industry and service to public welfare are discussed in extensive work. 36 pages.—*National Canners Assn., 1133 20th St., N.W., Washington 6.*

Circle 207N on Reader Service Card

### Sugar Market Work

Digest describes types and uses of sugar—sucrose—in relation to other types of sweeteners on market. 30 pages.—*Sugar Information, Inc., 52 Wall St., New York 5.*

Circle 207O on Reader Service Card

### Ultraviolet Apparatus

Bulletin on ultraviolet apparatus for sterile packaging, deodorizing, irradiation, and other functions is now available. 4 pages.—*Sun-Kraft Health Products, Inc., 158 E. Grand Ave., Chicago 11.*

Circle 207P on Reader Service Card

### Tin Plate

Pictorial volume portrays production and engineering involved in producing tin plate of many types. 16 pages.—*Wheeling Steel Corp., Wheeling, W. Va.*

Circle 207Q on Reader Service Card

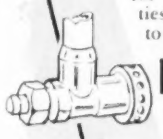

"A **Simple** CONTROL IS THE **Best** CONTROL"

. . . for efficiency's sake . . .

SPECIFY PHILLIPS FLOAT CONTROLS

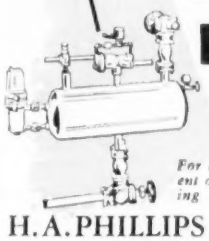
**FLOAT CONTROLS**

Direct Feed and Remote Feed types adaptable for high side or low side applications. Capacities range from 1 to 1000 tons for "Freon"; 1 to 2000 tons for ammonia.



**REFRIGERANT INJECTOR**

Phillips refrigerant injection provides high efficiency evaporation with "Freon", especially in high capacity, flooded operation.



**LIQUID RETURN SYSTEM**

The Phillips system protects ammonia compressors against liquid slop-over and gives dry suction line gas for top compressor efficiency.

*For dependable, efficient operation of your present or new equipment, choose Phillips—engineering advice willingly given. Write for catalog.*

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS
REFRIGERATION CONTROLS SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS
*REPRESENTATIVES:* THE C & S EQUIPMENT CO.
2103 S. San Pedro Street, Los Angeles, California
MASON EMANUELS CO. • 90 Dearborn Street, Seattle 4, Washington

*for*

**FREE READER SERVICE**

. . . use the handy coupon in the back of the magazine

Get literature, catalogs or detailed information that you need from manufacturers of equipment, materials, supplies, ingredients.

*for your convenience*

**USE READER SERVICE**

# "she might have been my kid..."

"There was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pigtails, and with the sun shining on it, she might have been *my* kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know why *I'm* giving blood."

Yes, all kinds of people give blood—truck drivers, office workers, salesmen. And—for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a local hospital, a combat area or for Civil Defense needs—this priceless, painless gift will some day save an American life!

**Business Executives!**

**✓Check These Questions!**

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

## Give Blood Now

***CALL YOUR RED CROSS TODAY!***

***NATIONAL BLOOD PROGRAM***

# PROFESSIONAL SERVICES

**J. PAUL BISHOP AND ASSOCIATES**
*Consulting Food and Chemical Engineers*
Specializing in:
Designing, Estimating and Engineering of New and Modernizing of Old Food and Chemical Plants and Processes.
Internationally Known.
Write P. O. Box 348
Champaign Illinois

**LEWIN ASSOCIATES**
*Industrial Consultants*
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultations—Reports—Market Investigations—Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Formulae, New Products.
8 West 47 St., N. Y. 36, N. Y. JUdson 6-1748

**SCHWARZ LABORATORIES, Inc.**
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

**BRADBURY RESEARCH ASSOC., INC.**
*Food Plant Consultants*
PLANT SANITATION—MANDATORY LABELING.
LABORATORY SERVICES; Filth in foods, food analysis, bacteriological tests.
817 Moody Street Waltham 54, Mass.

**KARL B. NORTON & ASSOCIATES**
*Successors to*
**DONALD K. TRESSLER & ASSOC.**
*Food Technologists and Engineers*
Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.
North Compo Road Westport, Conn.

**FOSTER D. SNELL, INC.**
*Research Chemists and Engineers*
Organoleptic Panel Testing, Formulation and Stability; Protective Packaging.
Inquiries invited on food research problems.
(Official Laboratory Association of Food Distributors, Inc.)
29 West 15th Street New York 11, N. Y.
WA 4-8800

**FOOD DEVELOPMENT LABORATORY**
*Consulting Service*
S. W. ARENSON, DIRECTOR
Service to the Baking and Potato Chip Industries
Baking, Frying, Chemical, Physical
Product Development Formulation Quality Control
1403 Eutaw Place 1133 Broadway
Baltimore, Md. New York, N. Y.

**GUSTAVE T. REICH**
*Consulting Chemical Engineer*
Continuous Processes Sugar
Complete Plants Yeast, Molasses
Alcohol - Dry Ice - Waste
1422 Chestnut St. Philadelphia 2, Pa.

**STRASBURGER & SIEGEL**
Chemists - Bacteriologists — Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony
1403 Eutaw Place Baltimore 17, Maryland

# Ingredients
For the Food Processor

**CARROT OIL makes foods golden yellow**

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

**SEND FOR BOOKLET**
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

**NUTRITIONAL RESEARCH ASSOCIATES**
**205 Broad St., South Whitley, Ind.**

**WHERE TO STORE FROZEN FOODS**

**QUAKER CITY COLD STORAGE CO., Inc.**
**PHILADELPHIA, PA.**
**3 WAREHOUSE LOCATIONS**
*Proper Temperature for Frozen Foods*

# SEARCHLIGHT SECTION

(Continued on pages 210-213)

*REPLIES (Box No.): Address to office nearest you*
*NEW YORK: 330 W. 42nd St. (36)*
*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

## POSITIONS VACANT

LABORATORY ASSISTANT for old established New England Food concern. To assist in Food Control Testing. Preferably recent Food Technology graduate. Please give full particulars including education, experience and salary desired. P-6288, Food Engineering.

WANTED—BY manufacturer of supplies for the ice cream, confectionery and bakery trades, young chemical engineer or chemist with experience in manufacture of ice cream. Allied experience will be considered. Duties include technical service to the ice cream industry and production. South. Submit complete resume and salary requirements. P-6427, Food Engineering.

WANTED: DAIRY Chemist, graduate degree, background physical and biological chemistry, for research and development work with expanding milk processor. Must have initiative to assist in planning and organizing his own work. Industrial experience helpful but not required. In reply describe education, experience, state age and salary requirement. P-5659, Food Engineering.

## EMPLOYMENT SERVICE

SALARIED PERSONNEL $5,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

(Continued on the following page)

**CHEMISTS—ENGINEERS**
**An active, confidential service! Interview at your convenience.**
Call, write or wire:
**Gladys Hunting (Consultant)**
**Drake Personnel, Inc.**
**7 W. Madison St. Chicago 2, Ill.**

**SPICE GRINDER**

Excellent opportunity for well trained and competent man versed in operation and maintenance of various types of grinding and milling and processing machinery, for nationally known spice house located in Northern California.

Desirable age bracket 35-45 years, with several years continuous experience.

Forward full qualifications, record references, salary requirements.

P-5622, Food Engineering
68 Post Street, San Francisco 4, California

**COURSES IN FOOD TECHNOLOGY**
a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to U. S. D. A. standards
h. Mold Counting and Insect Examination

MEN OR WOMEN; VETERANS OR NON-VETERANS; NIGHT CLASSES

Highly qualified instructors with practical experience and degrees in their respective fields.

**MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS**
P. O. Box 383, Coral Gables, Florida
Telephone: 87-5881

# CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

## EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

**UNDISPLAYED RATE:**

$1.20 a Line—Minimum 3 Lines.
To figure advance payment count 5 average words as a line.
POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of above rate, payable in advance.
PROPOSALS, $1.20 a line an insertion.

**INFORMATION:**

BOX NUMBERS count as one additional line.
DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

**DISPLAYED RATE:**

The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

*NEW ADVERTISEMENTS Address New York Office, 330 W. 42nd St., New York 36, N. Y., for the February Issue closing January 23rd*

### POSITIONS WANTED

Foods BACTERIOLOGIST Ph.D. 27, research experience, background in biochemistry, enzymes, vitamins. Desires position investigating microbial problems in food spoilage, packaging, freezing, preservatives, antibiotics. PW-6254, Food Engineering.

FOOD TECHNOLOGIST — Chemist — Bacteriologist. Experienced food technologist, chemist, bacteriologist and plant engineer, with ten years experience in food canning and freezing, and knowledge of cost analyses desires position in technical management, plant engineering, quality control. Has had foreign experience and Government work. Prefers West Coast. Will consider foreign employment. Age 38. PW-6281, Food Engineering.

FOOD TECHNOLOGIST, aged 31, married, with 6 years of quality control and federal inspection and supervision in frozen, canned, and dehydrated foods processing and allied food service. Possess Food Technology degree and references. Desire location in Midwest. Available February, 1953. PW-6228, Food Engineering.

FOOD TECHNOLOGIST with wide experience in the production, manufacture, control, and development of many dessert, confectionery, chocolate, cereal and other food products, desires a position of responsibility to fully use his ability. PW-6214, Food Engineering.

PRODUCTION MAN, 25 years practical and technical experience. Good record as commercial chef in product development work, and production of quality products, preserves, jellies, condiments, soups, sauces and various specialties. Will relocate. Available immediately. PW-6329, Food Engineering.

### SELLING OPPORTUNITIES WANTED

EMPLOYED SALESMAN, Responsible for southern regional territory selling meat foods and other perishable trades, wants protective and insulation packaging lines that can be sold direct and/or specialty ingredients and equipment specialties all on an exclusive basis for Florida and small adjacent territory. Manufacturer, long experienced in sales and sales promotion fields in foods. Headquarters in future at Jacksonville. SA-6225, Food Engineering.

WE WANT products to sell for responsible firms. Two experienced salesmen with established following, regular coverage N.Y. Metropolitan area, Conn. & N.J. Finished products or raw materials for ice cream, baking confectioners, flavors, and allied food trades. BA-6148, Food Engineering.

### BUSINESS OPPORTUNITY

I HAVE new equipment and building for mayonnaise manufacture. I want partner with complete knowledge of manufacture and sales help. Small capital required. Geo. Boardman & Bro., 329-355 Broadway, Watervliet, New York.

**POTATO CHIP PLANT**
BUILDING AND EQUIPMENT
**FOR SALE OR LEASE**
FERRY MACHINE MODEL B
*Complete Packaging Line New York City Area*
BO-6376, Food Engineering
330 W. 42 St., New York 36, N. Y.

*When Answering*
**BOX NUMBERS . . .**
to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

**WANTED:**
**SURPLUS BOTTLES, JARS AND CAPS**
We buy excess inventories of bottles, jars and caps of every description.
**PENN BOTTLE & SUPPLY CO.**
5619 Cherry St.
Phila. 39, Penna.

***WANTED***
**TO EXPEDITE PRODUCTION**
Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pans, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.
P. O. Box 1351
Church Street Sta., New York 8, N. Y.

**FOOD PLANT WANTED**
We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.
Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. BA 7-1819

*Wanted to buy:*
One Cabinet Type
SPRAY DRYER
Complete with bag collectors.
Capacity to produce 250-350 lbs. dried milk per hour. Prefer stainless steel lining and automatic discharge.
P. O. Box 116, Topeka, Kansas

FOR SALE
**SHRIMP PROCESSING PLANT**
With Ice Manufacturing Facilities.
NEAR NEW ORLEANS, LA. TERMS.
SUPREME FOODS, INC.
PRINCETON, ILLINOIS

**FOR SALE**
Triangle A-4C-A Electra Tri Pak Fillers, fully automatic, 100 per min., with conveyors and feed.
Horix 14, Kiefer 22 and U. S. 24 spout vac. Fillers.
Two Capem 4 head Cappers
3 Kiefer Bottom Up Air Cleaners
3 Standard Knapp Bottle Packers
7 Ermold 6 and 8 wide automatic Labelers
1 Creamery Package Homogenizer 200 gal.
1 Cherry Burrell Spray Pasteurizer 200 gal.
1 Republic Flexmaster 16" Filler
1 Sparkler Stainless Steel 14-4 Filter
2 Filco Mod. 50 Filters
Stainless Steel Tanks, Pumps, Valves
1—Stainless Steel 400 gal. Jacketed Tank
Roller Conveyor 16" and 26" wide
**SEIFERT MACHINERY COMPANY**
1433-47 N. Twelfth St. Phila. 22, Pa.

***FOR SALE***
1—2000 GALLON CHERRY BURRELL
Stainless Steel lined horizontal, cylindrical storage tank with agitator and 3" cork insulation.
**HERSHEY CREAMERY COMPANY**
Box 121, Harrisburg, Penna.

NEW REBUILT MACHINERY USED
FOR FOOD & CHEMICAL PROCESSING
- 500 Gal. Pfaudler SS Tank
- World Rotary Auto. Labeler
- 8 SPT Gravity Siphon Filler
- Diamond Water Softener
- Sanitary Pump and Motor
- Conveyors and Acc. Tables

*IN STOCK*
*FOR IMMEDIATE DELIVERY*
**PROCESS INDUSTRIES**
307 POWELL ST. BROOKLYN 12, N.Y.
DICKENS 2-1021

1 Filler Machine for Sour Cream, 3 Nozzles w/cappers for disc caps 2⅜" SS hopper. Fills to 22 oz. per stroke—adjustable.
1 1000 gal. Manton-Gaulin Homo—SS head Excellent condition.
**D'ORSAY EQUIPMENT CO. INC.**
14 Harding Ave. Malden 48, Mass.

***FOR SALE***
**ERMOLD MODEL 60-31 AUTOMATIC LABELLER**
postwar machine capable labelling various jars and tumblers at rate 120 per minute complete with two extra sets pickers and label boxes. Condition excellent. Will consider reasonable offer.
**W. T. YOUNG FOODS, INC.**
Lexington, Kentucky

**Sparkler Horizontal Plate Filter**
Model 18-S-15 in all iron construction, complete with scavenger plate feature, Viking iron rotary pump and 220 volt 60 cycle 3 phase drip-proof (H.P.) motor. Mounted on portable base. Cost new $1300.00. Willing to sacrifice, $895.00 F.O.B. Detroit.
**MICHIGAN SHORTENING CO.**
1116 Napoleon Detroit 7, Mich.

# OVERSTOCKED

## *No Reasonable Offer Refused*

## IMMEDIATE DELIVERIES

**UNION** Rebuilt Machinery — Established 1912 — Value, Price, Reliability, Prompt Service

International Stainless Steel Straightline Vacuum Filler, with automatic Feeder.
Resina Model LC automatic Capper.
Capem E4F 4-Head Rotary Capper.
CRCO New Way MH and Burt adjustable Wraparound Labelers.
Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Day and Robinson 100, 800, 1500, 2000 lbs. Dry Powder Mixers and Sifters.
J. H. Day 75 gal. Imperial Double Arm Steam Jacketed Mixer.
Day, Ross Pony Mixers 8 and 15 gals.
B. P. type 3500 gal. Steam Jacketed Double Arm Mixer.
Day 650 gal. Jacketed Jumbo Mixer.
Stokes, Day, New Era, Hottman Mixers, 2 to 3500 gals., with and without Jackets, Single and Double Arm Agitators.
Baker Perkins 150 gal. Unidor Steam Jacketed Double Arm Mixer.
Tri-Colloid #5 Mill and Homogenizer.
Mikro 4TH, 3TH, 1SH Pulverizers; Jay Bee, Schutz O'Neill, Stedman Mills.
Allis Chalmers, Great Western Sifters.
Colton 2, 3 Rotary Tablet Machines.
Pony M, ML Labelrites: Ermold, World semi, fully automatic Labelers.
Stokes & Smith A Transwrap Filler.
S. & S. G1, G2 and G6 Auger Fillers.
F. J. Stokes HG88 Duplex Auger Filler.
Whiz Packer and Spee-Dee Fillers.
Triangle Package Models G2C, G2S, N2CA Elec-Tri-Pak Fillers.
Horix and Elgin S.S. Rotary Fillers.
Filler 4-Head S.S. auto. Piston Filler.
Stokes, Colton semi auto. and auto. Tube Fillers and Closers.
Doughboy auto. Cellophane Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
Hudson Sharp Campbell automatic cellophane Wrapper.
Hayssen, Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia automatic Cellophane Wrappers.
Sweetland, Alsop and Ertel Filters.
Huhn Steam and Gas-Fired Rotary Dryers.
Pneumatic automatic Cartoning Unit, 60 and 30 per min.
Consolidated 13" Macaroni Presses.
Battery of Grimolas and Macaroni Mixers.
Clermont automatic Noodle Cutter.
Clermont Reversible Dough Brake.

***Additional Information and Prices Available on Request***

**UNION STANDARD EQUIPMENT CO.**
**318-322 Lafayette Street New York 12, N. Y.**

**TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT**

---

### FOR SALE

250 gal. S.S. Tank, 42" x 42", agit.
600 gal. S.S. Tank, 54" x 60".
75 gal. Monel Jkt. Kettle, 35" x 27", agit.
100 gal. S.S. Clad Jkt. Kettles, 30" x 52".
150 gal. S.S. Jkt. Kettle, 42" x 34", agit.
100 to 200 gal S.S. Mix Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
26" Centrifugal Extractors, 3 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes Vacuum Pump, 1½ H.P.
Hobart Grinder, 1½ H.P.
2" Cherry-Burrell S.S. Pumps, 2 H.P.
100 gal. Pfaudler S.S. Premixer.
3000 gal. S.S. Truck Tanks, Trailerized.
3—32" x 90" Buflovak Double Drum Dryers.
Milk Pasteurizers, Coolers, Fillers, Washers.

*Send us your inquiries*

**LESTER KEHOE MACHINERY CORP.**
**1 East 42nd Street, New York 17, N. Y.**
**Murray Hill 2-4616**

---

### 70 A. O. SMITH ONE-PIECE GLASS-LINED TANKS—FOR SALE:

The linings in each of these glass-lined tanks is almost perfect. The tanks may be inspected and can be shipped immediately. The price is about half of new. In almost all cases fittings and stands are included. Individual lots of the 70 can be purchased separately. Inspection is invited. Option will be cheerfully granted. Subject to prior sale.

| Quantity | Capacity Each | Dimensions |
|---|---|---|
| 8 | 18,135 gals. | 9' x 10' long |
| 12 | 13,857 gals. | 8'6" x 35' long |
| 4 | 10,168 gals. | 8' x 26' long |
| 14 | 8,525 gals. | 10' x 16' long |
| 12 | 6,758 gals. | 8' 10" 3" long |
| 1 | 6,355 gals. | 9' x 14' long |
| 12 | 6,262 gals. | 12' x 12' 3" long |
| 3 | 5,270 gals. | 7' x 20' long |
| 3 | 3,565 gals. | 8' x 10'8" high |
| 1 | 1,953 gals. | 7' x 6' high |

For Details Write

FS-6372, Food Engineering
330 W. 42 St., New York 36, N. Y.

---

## FOR PROMPT SHIPMENT

3—Lee 300 Gal. S.S. Jack. & Ag. Tanks.
9—Stainless Steel Kettles 125 to 959 Gals.
7—Stainless Steel Tanks 200 to 5700 Gals.
1—New Tolhurst 48" S.S. Centrifuges.
2—Bird 48" Sus. Style S.S. Centrifuges.
1—Buflovak 6' Jack. Vac. Crystallizer.
1—Stokes Vac. Shelf Dryer 6 Sh. 24"x36".
1—Premier U-3 S.S. Paste Type Colloid Mill.
4—Stokes 212C Vac. Pumps—100 cfm.
2—Sperry Filter Presses 36"—Hyd. Closures.
3—Shriver 18" to 42" Wd. P. & F. Filter Presses.
1—Sweetland #12 Filter—72 leaves.
3—Horiz. Spiral Mixers 1000 to 3000#.
5—Mikro Pulverizers, Lab. to 2TH Sizes.
1—Raymond 16" Screen Mill 5 H.P.
1—Robinson 1212 Rotary Cutter 10 H.P.
5—Double Drum Dryers 22"x36" to 42"x120".
2—Economic Erie City Boilers 200 H.P. 150# W.P. with Bolted Steel Bldg.

Send for your copy of Bulletin A-30, listing over 500 desirable items. We invite your inquiries and we pay top prices for individual items to complete plants.

**THE MACHINERY & EQUIPMENT CORP.**
**533 West Broadway**
**New York 12, N. Y. GRamercy 5-6680**

---

### FOR SALE
### Cherry-Burrell Viscolizer

**1800 GPH, 800 P.S.I. max., 25 HP, originally used to homogenize tomato juice.**

*Any reasonable offer accepted.*

**Box 921 Syracuse, New York**

---

## MODERN PACKAGING EQUIPMENT

**FOR IMMEDIATE DELIVERY**

**SPECIAL**

**PNEUMATIC SCALE CO.** 60 Per Minute Fully Automatic Cartoning Line consisting of Automatic Feeder, Bottom Sealer, 4 Scale Net Weight Filler, Top Sealer, Compression Unit and Sheet Feed Tightwrap.

PNEUMATIC SCALE CO. 35 Per Minute Automatic Cartoning Line
Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer and Compression Unit.
J. L. FERGUSON PACKOMATIC HIGH SPEED (70 Per Minute) Cartoning Line consisting of
Automatic Feeder, Top and Bottom Sealer, 18 Spout Volumetric Filler with rising and falling bed.
STOKES & SMITH Model B. Transwrap with Auger Fillers.
STOKES & SMITH Model HG84 Fully Automatic Auger Filler with vacuum attachment. Also Models G and GD Semi-Automatic.
PNEUMATIC SCALE CO. 10" Simplex Labeler.
PNEUMATIC SCALE CO. 4" Duplex Front and Back Labeler.
KARL GIEFER 24 Spout and 12 Spout Stainless Steel Rotary Vacuum Fillers.
CAPEM 4 Head Fully Automatic Capper.

**WANTED**

**Single Machine or Entire Plants**

**ALLIED EQUIPMENT CO.**
940-946 Nepperhan Ave., Yonkers 3, N. Y.
Phone: Yonkers 5-0442

IMC

# E-X-P-A-N-D-I-N-G?

**Look to FIRST for Quick Delivery on ADDITIONAL EQUIPMENT**

**COMPLETE PLANTS For Every Food Product**

Ask about the RENTAL-PURCHASE PLAN

**MIXERS**
New and Rebuilt Dry Powder Mixers of the Ribbon Type in Stainless and Mild Steel in all sizes Heavy Duty Mass Mixers, both steam jacketed and unjacketed up to 150 gal. Tumbling Barrel Batch Mixers.

**Stainless KETTLES—TANKS**
Large stock on hand of Jacketed Kettles up to 300 gal. Single Shell Tanks up to 3000 gal.

**DICERS—CUTTERS—CHOPPERS—SLICERS**
Urschel Model B in S/S; Sterling EM-1D American Relish Cutters; Smith Silent Cutters; Boutell S/S Slicers; Peelers; Biro Stainless Steel Meat Saw, 1½ HP.

**DRYERS—DEHYDRATORS**
2 S/S Atmospheric Drum Dryers 5'x10'. 1 Double Drum Dryer; 28"x5'. Proctor & Schwartz Apron Dryer 40'.

**PULPERS—FINISHERS—JUICE EXTRACTORS**
Langsenkamp S/S Model B†EZ Adjust Pulpers with 7½ HP motors; others. Chisholm Ryder S/S Model B Extractors.

**FILLING EQUIPMENT**
M. & S. 10 Pocket S/S Can or Jar Fillers. Mojonnier S/S 14 Head Vacuum Filler. Filler Mach. Co. and Elain Piston Fillers. Juice Fillers by FMC, Horix, Berlin Chapman. Dry Powder Fillers by Stokes & Smith.

**LABELLING EQUIPMENT**
Wrap around Can and Jar Labellers by Standard Knapp, Burt, Kyler, Nu-Way etc. Spot Labellers semi and fully automatic.

**MISCELLANEOUS**
Standard Knapp Casers or Boxers, Case Printers; Aut. Gluers and Sealers; Pasteurizers, Washers, Colloid Mills, Coolers, Exhausters, Centrifugals, and hundreds of other items. WHAT DO YOU NEED?

FRED R. FIRSTENBERG, Pres.

**FIRST MACHINERY CORP.**
**157 Hudson Street, New York 13, N. Y.**



# NOW LIQUIDATING

equipment from closed breweries

AT MARION, INDIANA, we offer excellent bargains in grain handling equipment including a Dracco pneumatic system; ammonia compressors with condensers; Niagara Cooling units; cookers; filters; pumps; case conveyor (power and gravity); office and machine shop equipment; also 600,000 gallons total capacity welded steel tanks (brewery lining) from 3500 gal. to 12,500 gal. sizes.

AT CLEVELAND, OHIO, we offer 47 vertical closed top cypress tanks from 3,700 gal. to 10,000 gal. sizes.

AT NORFOLK, VA., we offer 15 horizontal welded steel tanks (Lastiglas lined); 2 welded steel grain bins 4900 cu. ft. each; cookers; filters; case conveyor, etc.

**FOR SALE FROM STOCK**

70—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 10, 40, 60, 80, 100, 150, 500 gal.
3—Lee 300 gal. T316 stainless steel salad dressing starch base cookers, water jacketed, double motion agitators.
9—3000 gal. Horiz. Stainless Steel Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.
35—Stainless Steel Tanks, 30, 60, 100, 150, 200, 300, 400, 500, 1000, 1400, 3000, 4200, 5700 and 16,200 gal.
35—Aluminum Tanks, closed, 275, 330, 480, 500, 1350, 1450 gal.
8—15,000 gal. Vertical Steel closed Processing Tanks, 80# int. W.P., with 970' 3" pipe coil and turbine agitator with 40 HP drive.
2—Triangle G-2-C Elec-Tri-Pak Weighers & Fillers.
1—Elgin Auto. Twin Piston Filler, St. St.
2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.
1—Pneumatic Scale Auto. Duplex Labeler, Front & Back.
1—Kyler model "H" Wrap Around Labeling Machine, to #10 cans.

**PERRY EQUIPMENT CORP.**
1411 N. 6th St. PHILA. 22, PA.



IF THERE IS

***Anything you want***

that other readers of this paper can supply

**OR—**

***Something you don't want***

that other readers can use, advertise it in the

Searchlight Section



**A BRILL BUY . . . IS THE BEST BUY**

***SEE THESE VALUES!***

1—Link Belt Roto-Louvre Dryer 3'10" x 16' Stainless Steel. New
1—Link Belt Roto-Louvre Dryer 2'7" x 8' Monel.
3—Devine Single Door Vacuum Shelf Dryers, 7, 8 and 20 40" x 43" shelves
2—Stokes 30# x 8', 3' x 15' Rotary Vacuum Dryers.
2—Pfaudler 100 gallon, glass lined, jacketed stills with glass lined condensers and receivers.
1—25 gallon, Stainless Steel, Jacketed Still.
3—Buflovak 5' x 12', 42" x 120", 32" x 100" Double Drum Dryers.
1—Allbright Nell 60" x 80" Single Drum Flaker.
3—Groen 150, 125 gallon, Stainless Steel, Agitated Kettles.
3—Mikro Pulverizers #2TH Stainless Steel, #1S1 and #1SH.
1—AT&M 42" Stainless Steel, Suspended Centrifugal.
1—Tolhurst 26" steel Suspended Centrifugal.
1—Sperry 24" Aluminum P&F Filter Press. Open Delivery.
4—Rodgers New Mixers 400 to 3000#.
1—Robinson 40" x 104" Triple Deck Gyratory Sifter.
1—Bird 18" x 28" steel Solid Bowl Continuous Centrifuge.

***Send for complete stock list***

**BRILL EQUIPMENT COMPANY**
*2401 Third Ave., N. Y. 51, N. Y.*
Tel: CYpress 2-5703 • Cable: Bristen, N.Y.



FOR SALE

**PEANUT BUTTER FILLING MACHINE**

6 cylinder Filler Machine Company peanut butter filling machine complete with right angle discharge stainless steel contact parts, adjustable tubes complete with hopper agitator. Postwar machine in excellent condition complete with spare parts. Will consider reasonable offer.

W. T. YOUNG FOODS, INC.
Lexington, Kentucky



# –FOR SALE–

1—J. H. Day Stainless Steel Jacketed Mixer, Sigma Blades, 10 Gals.
1—Baker Perkins Stainless Steel Dispersion Mixer, Size 15, Type VUMM, 100 Gals. Working Cap., 150 Gals. Total Cap., 75 HP Drive.
1—Baker Perkins Stainless Steel Jacketed Lab. Mixer, Size 1 with 2 HP Explosion Proof Motor, 0.7 Gals. Cap., Sigma Blades.
3—Shriver Aluminum Plate & Frame Filter Press, 24" x 24", Closed Delivery, 35 Chambers.
1—Sperry Aluminum Plate & Frame Filter Press, 42" x 42", Closed Delivery.
1—Pfaudler Glass Lined Vacuum Kettle, 500 Gals. Cap.
1—Glasteel Glass Lined Jacketed Vacuum Reactor, 1600 Gals. Cap. (Unused).
6—Pfaudler Glass Lined Pressure Tanks, 300 Gals. Cap. 15PSI.

**R. GELB & SONS, INC.**
**UNION, N. J.**
Est. 1886 UNionville 2-4900

## YOUR BEST SOURCE for Used Equipment in U. S.

**FILLERS**

FMC M&S 6 pocket for #10, S.S. contact
FMC M&S 10 pocket, S.S. for small cans
FMC M&S 6 pocket #2-2½ cans. Bronze cont.
Masonnier 24 Spout, rotary, S.S. contact
A-B Hand Pack, 8 oz, #1-2, #2½ change pts
Horix 18 Spout rotary automatic, S.S. cont
Geyer 6 piston, S.S. contact parts

**SYRUPERS**

A-B 20 valve, for 2-2½ cans (2)
Judge 20 valve for 2½ size cans
A-B 12 valve, for 2½ size cans
A-B 12 valve, set for #1 tall cans
Sprague Sells 8 valve, for 2½ size cans
A-B 6 valve, for #10 size cans

**VACUUM PANS**

Krenz S.S. pan, 6' x 12' with 400' coildia
Rogers S.S. 6' diameter, Coil type
Buffovak 2 Effect 5' copper, ex heaters
Acme Coppersmith, 5' diameter, coil type

**COOKERS AND COOLERS**

A-B #10 Cooker and Cooler, 560-300 can cap'y
A-B #2 2½ Cooker Cooler, 1850-925 cans cap
A-B #2 2½ Cooker Cooler, 1186-900 cans cap
A-B 8 oz. Cooker Cooler, 2400-400 can cap

**LABELERS**

Knapp 8 oz #10 adjustable. Heavy duty
Kyle 8 oz #10 adjustable, 2 Glue Pots
Burt adj. 8 oz. #10 quick adjustable
Norris 8 oz #10 quick adjustable
Burt 8 oz 46 oz., quick adjustable

**EXHAUST BOXES**

Sprague Sells #10, 550 can holding cap.
A-B Single Deck No. 10, 210 can cap'y
A-B Double Deck, 2-2½'s, 1058 can cap'y

**PEELERS**

FMC or Urschel continuous, 5 HP motors
Dunkley Lye, 42" wide x 70' long. Complete
Atlas Pacific Lye, 42" Draper, 5 TPH
Sterling Abrasive, 28", motorized

**CASERS**

Standard Knapp, Model FE, 404 x 700
Burt, Model PCE for 306 x 300 cans
Knapp, Model FE, for 211 x 414 cans
Burt, Model PCE for 2½ cans
Burt, Model PCE for #2 cans

**RETORTS**

Reid Horizontal Qk opening 54" dia x 15'6"
5 Can Pack Vertical 40" x 72". New shells
4 FMC vertical 2 basket 42" x 60" (new)
2 Horizontal 5' x 16', with qk opening door
4 Dundon Horizontal 54" x 22' eccentric lock
15 FMC 4 basket vertical, 42" x 30"

**MISCELLANEOUS**

Rietz RD-18 Disintegrator with 50 HP motor
Monel 2200 Gallon closed Tank. Brand new
Scotch 125 HP, 150# Boiler; fully auto
Capem 4 head rotary Capper. Set for 28 mm
American Utensil Model R2 Relish Cutter
Urschel Model B Dicer. Stainless contact
Proctor Schwartz Apron Dryer, 8' x 96'
American Utensil Model B Juice Extractor
FMC Juice Extractor, stainless, motorized
Filter 6' x 8' Oliver Precoat (2)
Sperry Bronze 18" x 18" with 25 rec plates
Shriver 26"x26" iron, 60 chambers plate & fr
FMC Model 50 Pulper, S.S. 10 HP
North Sewage Screen, 8' dia. bronze
Sealer, Knapp Model 429, top & bottom
A-B 9 knife Peach Slicer, S.S. motorized
Hassen 5-11 Wrapper, for 2½ and 5# pack
Stokes Tite-Wraps, factory rebuilt (2)
Rotex Sifter #42, 4'x8', 2 decks
A.T.&M. 30" Sus. Centrifugal, 7½ HP

PARTIAL LIST ONLY—WE BUY YOUR SURPLUS

**MACHINERY AND EQUIPMENT COMPANY**
514 Bryant Street • San Francisco 7, Calif.



*WE HAVE IN STOCK*
*FOR IMMEDIATE DELIVERY*
*THE FOLLOWING TYPES OF EQUIPMENT*

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

**AARON Equipment Company**
1347 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHelsea 3-5300



**YOUR PREFERRED SOURCE FOR GOOD REBUILT EQUIPMENT**

Sparkler SS Filter Model 33-D-17
Urschel Model B Dicer with Motor
FMC 17 Spout Rotary SS Gallon Filler
4 Transwrap Machines Model A, B & BB
Sprague Sells Rotary SS Filler Model #60 Fills From #1 to #10 Containers, Complete Unit & Motor
Pfaudler 30 Gal. Glass Reactor Model LMC
Type 347 S.S. Reactor, Jktd & Agtd 30 gal. Unit
Knapp & Burt Can or Jar Wrap Around Labelers
FMC Hand Packed SS Filler Complete Unit
Stokes & Smith Vacuum Powder Filler
Capem & Resina Automatic Cappers
New & Rebuilt Ribbon Blenders Steel & SS
New & Rebuilt Kettles, Tanks & Reactors Steel & SS
All Sizes—Send Us Your Specs.

WHAT HAVE YOU FOR SALE?
For Better Buys & Service
Phone SOuth 8-4451—9264—8782
*YOU CAN BANK ON*

**EQUIPMENT CLEARING HOUSE, INC.**
289-10th ST., BKLYN 15, N. Y.



**FOR SALE**

250 gal. Copper Steam Jacketed Kettles for 100 lbs. working steam pressure
300 gal. Copper Still with condenser and tank
80 qt. 3 speed Read Vertical Mixer
30 qt. 3 speed Hobart Vertical Mixer
#76 Enterprise Food Grinder, belt drive
Burns Split Nut Peanut Blancher, motor drive

**SAVAGE BROS. CO.**
2633 Gladys Ave. Chicago, Ill.



*FOR SALE*

**MODEL 841 SANITARY CHERRY BURRELL VISCOLIZER**

Stainless Cylinder block 800 G.P.H. 3000 P.S.
1—30 HP Motor. Price $2500.00.

**PACIFIC PROCESSING CORP.**
Terminal Island, Calif.



**FOR SALE**

**CARRIER REFRIGERATION**

Used Centrifugal Refrigerating Machine, Model 17-M, size 42, applicable to all refrigeration and air conditioning requirements, maximum 240 tons, direct connected to Murray low pressure steam turbine. Can be used for various capacities and temperatures. Complete unit, excellent condition. Can be purchased at a saving of fifty percent of its new cost. CAN BE ARRANGED FOR MOTOR DRIVE.

**DENNY & CLARK**
1923 W. North Ave. Chicago 22, Ill.



**New "Searchlight" Adverisements**

received by January 26th appear in February issue, subject to space limitations.

*Address copy to the Classified Advertising Division*
Food Engineering
330 West 42nd St., New York 36, N. Y.



**BUY WITH CONFIDENCE IN 1953—**

## "CONSOLIDATED"

5—Devine #28 Vacuum Shelf Dryers, ea. 20 shelves 59" x 78" Complete.
3—6' x 50' Louisville Rotary Steam Tube Dryers.
6—Horizontal Dry Powder Mixers, 450 cu. ft., 2000#, 1000#, 400#.
1—3000# S/S horiz. ribbon Mixer.
1—Day size 30 Imperial unjacketed Stainless lined, Stainless blades, 75 gal.
1—42" All Stainless Centrifugal, A.T.&M. Co., 40 HP motor, suspended type.
8—Oliver Vacuum Filters, incl. 8 x 12' 11'6 x 14', 11'6 x 18.
1—18" x 28" Bird Continuous S/S Centrifugal, copper housing, 10 HP.
1—Mechanical 5' x 16' jacketed Cooker.
3—Mikro Pulverizers, 2TH, 2SI, 4TH.
1—30" x 30" Alum. Filter Press, 45ch.
1—13,500 gal. stainless clad, vertical mixing tank, S/S coils, 7½ HP motor.
4—Labour Stainless Centrif. Pumps.
2—#12 Sweetland Filters for 36 leaves on 4" centers or 72 lvs. on 2" c.c.
2—Pneumatic Scale Packaging Lines.
1—Std. Knapp #429 Self-adjusting Gluer-Sealer & Compression Unit.
1—Tolhurst 40" Monel Centrifugal.
1—Buflovak 6' Vacuum Crystallizer.
1—30" x 30" Shriver Filter Press, cast-iron, steam-heated.
8—Shriver 42" x 42" cast iron Pl. & Frame Filter Presses, 18, 27, 36, 54 chambers, 1" cake.
15—Sperry 18" x 18" cast iron Filter Presses, P. & F., 11 chambers.
2—700 gal. jacketed closed kettles with Simplex Turbo Mixers, m.d.
2—500 gal. steel jacketed, closed, agitated Vacuum Reactors, 125# jacket.
3—Vert. Retorts, 42" x 72", late type, with instruments and crates.
1—K.K. Rotary Vacuum 12 Stem S/S Filler and Capem Capper.
1—Prog. 2 spout S/S Filler, quarts and gallons.
3—Lee S/S jack. Vacuum Pans, 250 gal., 300 gal., 500 gal.
1—Shriver 18" x 18" Alum. Filter Press.
1—FMC S/S Pulper.

OUR 36th YEAR

**CONSOLIDATED PRODUCTS COMPANY, INC.**
13-17 PARK ROW
NEW YORK 38, N. Y.
BArclay 7-0600

*We Buy Your Idle Machinery*

# ADVERTISERS IN THIS ISSUE


Advance Oven Co. 164
Allegheny Ludlum Steel Corp. 169
Allis-Chalmers Mfg. Co. 4
Aluminum Cooking Utensil Co. 145
Amercoat Corp. 21
American Gas Association 179
American Chlorophyll Div., Strong Cobb & Co. 104
American Spice Trade Assoc. BR203
Amerio Contact Plate Freezers, Inc. 199
Ames Iron Works BR201

Bakelite Co., a div. of Union Carbide & Carbon Corp. 135
Barnes John Co., and W. F. 20
Barry-Wehmiller Machinery Co. 46
Bersworth Chemical Co. 196

Cambridge Wire Cloth Co., The 190
Canning Machinery Division 8
Carpenter Steel Co., The 34
Central Fibre Products Co., Inc. TR205
Century Electric Co. 155
Champion Belting Corp. 197
Chemical & Power Products Inc. 182
Chisholm-Moore Hoist Corp. 166
Chrysler Corp. (Dodge Div.) 180
Clark Equipment Co. 163
Cleaver-Brooks Co. 24
Continental Can Co. 26-27
Crane Co. 123
Crucible Steel Co. of America 43
Cyclone Fence Dept. TR187

Damascus Tube Co. 197
Darling Valve & Mfg. Co. 142
Darnell Corp. Ltd. 150
Day Co., The 173
Day Co., J. H., The 146
Distillation Products Industries 110
Dodge & Olcott, Inc. 172
Dow Corning Corp. 186
Downington Iron Works, Inc. BR189
Drehmann Paving & Flooring Co. 139

Firmenich Inc. 53
Fiske Bros. Refining Co., Lubriplate Div. 186
Florasynth Laboratories, Inc. BC195
Food Machinery & Chem. Corp 8
Foxboro Co., The 16
Frick Co. 184
Fritzsche Bros., Inc. 158
Fruehauf Trailer Co. 17
Fuller Co. 18
Fuller Brush Co., The 170

Gair Co., Robert 40-41
Gaylord Container Corp. Third Cover
General Amer. Transportation Corp. Tank Car 6
General Electric Co. Electronics Div., Commercial Equip. Dept. 152
General Mills, Inc. 199
Girdler Corp., The 137
Globe Woven Belting Co., Inc. 156
Gottscho Inc., Adolph TR189

Hapman Conveyors, Inc. 200
Herlex Mfg. Co. TR201
Hinde & Dauch Paper Co. 141
Hoffmann-LaRoche, Inc. 148
Hudson-Sharp Machine Co. 175
Huron Milling Co., The 12

Ingredients for the Food Processor 209

Jamison Cold Storage Door Co. 124
Jenkins Bros., Ltd. 23
Johns-Manville 122
Jones & Laughlin Steel Corp. 153

Keasbey & Mattison Co. 42
Klenzade Products, Inc. 131

LaPorte Mat & Mfg. Co. TR185
Layne & Bowler, Inc. TR203
Linde Air Products Co., a Div. of Union Carbide & Carbon Corp. 165
Link-Belt Co. 25, 47
Lubriplate Div., Fiske Bros. Refining Co. 186
Lunkenheimer Co., The 216

Magnus, Mabee & Reynard, Inc. 38
Malayan Tin Bureau, The 206
Manton-Gaulin Mfg. Co., Inc. 147
Marley Co., The 133
Master Electric Co., The 126
McGraw-Hill Book Co. 159
Minneapolis-Honeywell Reg. Co. Industrial Div. 48-49
Mississippi Agricultural & Industrial Board 144
Monarch Mfg. Works, Inc. 188
Multi-Clean Products, Inc., The 160
Mundet Cork Corp. 154

Nash Engineering Co. 50
Niagara Blower Co. 176
Nicholson Co., W. H. TR183
Nutritional Research Associates 209

Oakes Corp., E. T. 14-15
Oakite Products, Inc. 177
Oilgear Company, The 19

Package Machinery Co. 130
Paisley Products Inc. 10
Palmer Thermometers, Inc. 162
Pfaudler Co., The 159
Pfizer & Co., Inc., Charles 193
Philadelphia Quartz Co. BL195
Phillips & Co., H. A. TR207
Polak & Schwarz, Inc. 140
Potts Co., Horace T. 30
Powell Co., William, The 128
Pure Oil Co., The 39

Quaker City Cold Storage Co., Inc. 209

Reeves Pulley Co. 112
Rheem Mfg. Co. 35
Richardson Scale Co. 22
Riegel Paper Corp. 52
Rietz Mfg. Co. TL178
Ryerson & Son, Inc., J. T. 56

Sandvik Steel, Inc. 134
Sarco Co., Inc. 108
Scandia Mfg. Co. 102
Schutz O'Neill Co. BR183
Seaplant Chemical Corp. 194
Spraying Systems Co. BR205
Standard Oil Co. (Indiana) 151
Standard Steel Corp. BR195
Stearns Magnetic Inc. 143
Sterwin Chemicals Inc., Vitamins Div. Second Cover
Strahman Valves Inc. BL198
Sturtevant Mill Co., The 54
Swift & Company 31

Taylor Instrument Companies 204
Thermoid Co. 51
Timken Roller Bearing Co., The 114
Titeflex Inc. 190

Trent Tube Co. 117
Triangle Package Machinery Co. 202
Tri-Clover Machine Co. 37
Tropical Paint & Oil Co., The TL198
Turner & Haws Engineering Co. Inc. 136

Union Bag & Paper Corp. 191
Union Carbide & Carbon Corp. Bakelite Company 135
Linde Air Products Co. 165
U. S. Gasket Co. 132
U. S. Steel Corp. TR187

Van Ameringen-Haebler, Inc. 215
Victor Balata & Textile Belting Co. BL178
Victor Chemical Works 32-33
Viking Pump Co. BR185
Vilter Mfg. Co., The 168
Visking Corp., The 167

Wallace & Tiernan Co., Inc. 188
Walworth Co. 55
Western Precipitation Corp. Fourth Cover
Westinghouse Electric Corp. Air Conditioning Div. 29
Apparatus Div. 44-45
Where to Store Frozen Foods 209
White Motor Co., The 106
Worthington Corp., Air Conditioning & Refrigeration 36
Wyandotte Chemicals Corp. 174

Yale & Towne Mfg. Co., The 171
Yarnall-Waring Co. 28, BR187
York Corp. 161



PROFESSIONAL SERVICES 209

SEARCHLIGHT SECTION
*(Classified Advertising)*
H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 209
Positions Wanted 210
Selling Opportunities Wanted 210
Employment Services 210

EDUCATIONAL
Schools 209

BUSINESS OPPORTUNITIES
Offered 210

PROPERTY
For Sale 210
Wanted 210

EQUIPMENT
(Used or Surplus New)
For Sale 210-213

WANTED
Equipment 210


## SALES REPRESENTATIVES

| | |
|---|---|
| ATLANTA 2 | Ralph Maultsby |
| 1321 Rhodes-Haverty Bldg. | Walnut 5778 |
| BOSTON 16 | J. F. Juraschek |
| 350 Park Square | Hubbard 2-7160 |
| CHICAGO 11 | D. T. Kenney |
| 520 N. Michigan Ave | J. G. Cashin |
| | Whitehall 4-7900 |
| CLEVELAND 15 | Thomas E. Taylor |
| 1510 Hanna Bldg | Superior 1-7000 |
| DETROIT 26 | Thomas E. Taylor |
| 856 Penobscot Bldg. | Woodward 2-1793 |
| DALLAS 1 | J. H. Cash |
| First National Bank Bldg. | Prospect 7-5064 |
| LOS ANGELES 17 | J. H. Allen |
| 1111 Wilshire Blvd | Madison 6-4323 |
| NEW YORK 36 | J. F. Juraschek |
| 330 West 42nd St. | C. C. Randolph |
| | Longacre 4-3000 |
| PHILADELPHIA 3 | Edward A. Martin |
| 17th & Sansom Sts | Rittenhouse 6-0670 |
| PITTSBURGH 22 | Thomas E. Taylor |
| 7389 Oliver Bldg | Atlantic 1-4707 |
| SAN FRANCISCO 4 | Ralph E. Dorland |
| 68 Post St. | Douglas 2-4600 |
| ST. LOUIS 8 | D. T. Kenney |
| Continental Bldg. | Lucas 4867 |
| LONDON, ENGLAND | W. J. Tydeman |
| | 95 Farrington Street, E.C. 4. |


ADVERTISERS INDEX
Aaron Equipment Co. 213
Allied Equipment Co. 211
Brill Equipment Co. 212
Consolidated Products Co., Inc. 213
Denny & Clark 213
D'Orsay Equipment Co. 210
Drake Personnel, Inc. 209
Equipment Clearing House, Inc. 213
First Machinery Corp. 212
Gale, J. C. 210
Gelb & Sons, Inc., R. 212
Hershey Creamery Co. 210
Kehoe Machinery Corp., Lester 211
Loeb Equipment Supply Co. 212
Machinery & Equipment Co. (Calif.) 213
Machinery & Equipment Corp. (N. Y. C.) 211
Miami School for Processing Specialties 209
Michigan Shortening Co. 210
Pacific Processing Corp. 213
Penn Bottle & Supply Co. 210
Perry Equipment Co. 212
Process Industries 210
Savage Bros. 213
Seifert Machinery Co. 210
Seymour Packing Co. 210
Supreme Foods, Inc. 210
Union Standard Equipment Co. 211
Young Foods Inc., W. T. 210

For almost thirty-five years, we have produced ALVA imitation Maple and each year sales progressively increase.

The reason for this solid success is just plain "true-to-the-tree" goodness—for every use by bakers, confectioners, ice-cream makers, extract and syrup manufacturers.

If you don't know ALVA Maple,
send for your sample now!

**VAN AMERINGEN · HAEBLER, INC.**

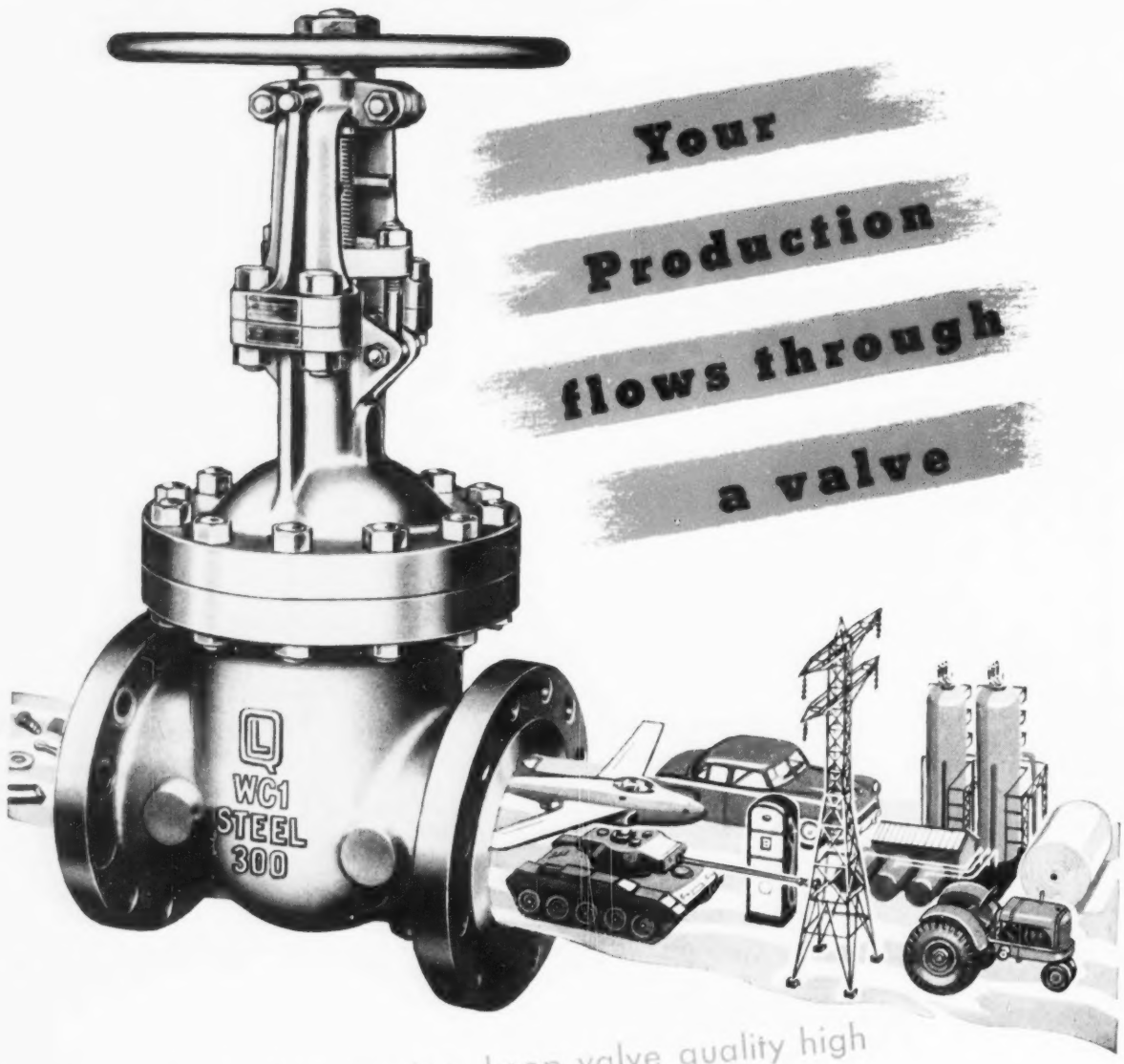
521 WEST 57th STREET: NEW YORK 19, N. Y.

Alva FLAVORS



For more information, use coupon on last page.

# Your Production flows through a valve




To keep production moving, keep valve quality high

FIG. 123
**N·M·D**
(Non-Metallic-Disc)
**BRONZE VALVE**

Correctly engineered for long life in handling steam, hot water, cold water, air and gas, oil, gasoline, butane, propane.

Any plant, regardless of type or size, uses valves—bronze, iron, or steel. Industry relies on Lunkenheimer Valves that stay on the job, year-in, year-out . . . helping sustain continuous peak production. And that's why Lunkenheimer quality is so essential today.

Industry's faith in Lunkenheimer Valves is based on nearly a hundred years of experience with Lunkenheimer design, materials, and workmanship.

**BRONZE • IRON • STEEL**

**LUNKENHEIMER**

THE ONE *Great* NAME IN VALVES

L-152-26

## QUICK PRODUCT-FINDER


Adhesives .....10, 31
Air-conditioning equipment....29
Aluminum .....205
Aluminum equipment .....145
Aseptic canning equipment....20
Bag sealer-labeler .....203
Bags
  Cellophane .....138, 143
  Paper .....207
  Polyethylene .....143
Banding machinery, bottle....89
Bearing materials, plastic....207
Bearings, roller .....114
Belt lacing .....205
Blender .....146
Boilers .....24, 105
Bottle washer, milk.....201
Brushes .....170
Burner safeguards .....203
Canning book .....207
Cans .....27, 141
Carton closer ... .....130
Carton opener .....88
Cartons, boxes.....40-41, 191 205, 219
Caser, bottle .....89
Casters .....150
Castings, stainless .....169
Chopping block unit.....113
Chlorophyll, chlorophyllin ...104
Cleaner, bev. case.....89
Cleaning compounds .....115
Cleaning equipment, floor....207
Cleaning materials .....205
Closing machinery, can.....107
Closures
  Plastic-wire .....143
  Vacuum .....142
Coatings
  Protective .....21, 115, 207
  Rubber .....205
Coders, carton .....189
Colloids .....194
Compressors .....50
Controller, pneumatic .....203
Controls
  Electronic .....48-49
  Positioning .....107
Conveyor belting
  Cleated .....197
  Flexible steel .....185, 187
  Neoprene-cotton ....156, 178
  Plastic-coated .....113
  Rubber .....51
  Wire-mesh .....190
Conveyor-lowerator .....107
Conveyor table .....134
Conveyors
  Air .....18
  Belt .....100
  Elevator .....47
  Screw .....25
  Tubular .....200
  Wheel, portable .....113
Cooker-cooler, continuous .....8
Cooking equipment, gas.....201
Cooler, continuous .....46
Corn, book .....207
Crusher, jaw .....54
Cutter-wrapper, butter .....100
Detector, electronic .....20
Disintegrators .....178
Dispenser, liquid .....109
Dockboard .....113
Doors, cold-storage .....124
Drives
  Gear .....101
  Var.-speed .....19, 112
Drums, pails .....153
  Steel lithograph .....35
Dust collector .....136


CONTINUED ON OTHER SIDE

# Reader Service

**For food-plant employees and consultants only . . .**

**FOR MORE INFORMATION about equipment, supplies, and processes discussed in the editorial and advertising pages of this issue of Food Engineering . . . mail this coupon**

**HERE'S A HANDY INDEX to equipment, supplies, and processes discussed in this issue**

Simply circle page numbers of items which interest you. More information will come to you direct from suppliers.

Tear on dotted line

Tear on dotted line

**TEAR OUT, put in envelope, mail to**

Reader Service Department
FOOD ENGINEERING
330 West 42nd Street
New York 36, N. Y.

Please send me additional information on items indicated below.

(PLEASE PRINT OR TYPE)

Name ..... Title .....

Company ..... Product .....

Street ..... City, State .....

## CIRCLE PAGE NUMBERS BELOW

2 Vit. A-color
4a Bul. 51B6052
4b Bul. 20B6051
6 Tank cars
8 Cont. cooker-cooler
10 Data sheet, Bul. 21
12 M5G
15 Mixer-depositor
16 San. contr. valve
17 Truck bodies
18 Air conveyor
19 Var.-speed drive
20 Bul. E153
22a Bul. 0450
22b Bul. 0550
24 Boiler cat.
25 Screw-conveyor
28 Bul. T-1740
29 Air-cond. equip.
30 Stainless fittings
31 Adhesives
33 Leavening agent
34 Stainless tubing
35 Litho. drums
36 Compressors
37 Stainless fittings
38 Butterscotch #4
39 Lubricants
41 Cartons
42 Insulation mtl.
43 Stainless steel
45 Electrical equip.
46 Auto. cooler
47 Book 2175
49 Data sheet 3.2 15-A
51 Cat. 3679
52 Papers
53 Raspberry flav.
54a Swing-sledge mill
54b Jaw crusher
54c Sample grinder
54d Crushing rolls
55 Circular 84
56 Chrome stainless bul.
88A Carton opener
88B Stacker
88C Detergent feeder
88D Water treat. equip.
88E Bottle washer
88F Bottle soaker
89A Bev. case cleaner
89B Bev. case cleaner
89C Bottle caser
89D Cello. banding mach.
89E Bottle uncaser
89F Unscrambler table
99A Milk carton filler
99B Copper-clad steel
99C Motor
100A Butter pkg. mach.
100B Steel pallet
100C Incline conveyor
101A Contr. system transmitter
101B Automatic switch
101C Gear drives
102 Packaging mchy.
103A Pulverizing mill
103B Scoop-rotor pump
103C Motor control
104 Chlorophyll, chlorophyllin
105A Air-operated pump
105B Fork-lift truck
105C Package boilers
106 Trucks
107A Positioning contr.
107B Conveyor-lowerator
107C Can-closing mach.
108 Steam traps
109A Liquid dispenser
109B Auto. emergency power panel
109C Weigher-feeder
110 Emulsifier
111A Scale feeder
111B Pressure test gage
112 Cat. FE 63b-G
113A Dockboard
113B Carton printer
113C Port. wheel conv.
113D Shaft-coupler
113E Poly-vinyl belting
113F Chop. block unit
114 Roller bearings
115A Change-can mixer
115B Plastic resin coat.
115C Cleaning comp. 80-A
115D Fast-dry enamel
115E White plastic gloves
117 Stainless tubing
122 Pressing aid
123 Cast-iron valves
124 Cold-storage door
126 Fluid dr. motor
128 Valves
130 Carton closer
131 Sanitation mtls.
132 Gaskets
133 Cooling tower
134 Conveyor table
135 Pkg. booklet
136 Dust collector
137 Heat-trans. equip.
138A Cellophane bags
138B Cellophane bags
138C Cellophane bags
139 Bul. M-1
140a (ad) Almond-coconut fl.
140b (ad) Butter flavor
140c (ad) Custard flavor
140A Acetate-foil packet
140B Cello. overwrap
141a (ad) Pkg. booklet
141A 10½-oz. cans
142a (ad) Bul. 4401
142b (ad) Bul. 4502
142A 8-oz. jars
142B Vacuum closures

LISTINGS CONTINUED ON OTHER SIDE

## INDEX to equipment, supplies and processes in this issue (See other side)


Dust control equipment.....201
Dust filters .....173, 203
Dryers .....195
Electrical equipment .....44-45
Electric eyes .....203
Embezzlement contr. .....207
Emulsifier .....110
Enamel, fast-dry .....115
Fabric, non-woven .....167
Feeder, detergent .....88
Filler
  Milk carton .....99
  Weigh .....202
Filters .....190
  Vacuum .....203
Fittings, stainless .....30, 37
Flavors ....140, 158, 172, 203
  Butterscotch .....38
  Maple .....215
  Raspberry .....53
Flooring, brick .....139
Floor machines .....205
Floor maintenance .....160
Foam agent, anti- .....186
Foil containers .....207
Freezer, plate .....199
Freezers, continuous .....201
Gage, pressure-test .....111
Gas .....179
Gas combustion book.....207
Gaskets, packings .....132, 182
Gloves, plastic-coated .....115
Grinders, sample .....54
Heaters
  Screen .....201
  Unit .....203
Heat-exchangers .....201
Heat-transfer equipment..137, 189
Hoist, chain .....166
Homogenizers .....147
Hose .....205
Ice-makers .....161
Indicators, flow .....203
Instruments
  Control .....204
  Temperature .....162
  Trouble-shooting .....207
Insulation materials..42, 154, 205
Jars, glass .....142
Labels .....142
Leavening agent .....32-33
Lubricants ...39, 151, 177, 186
Meat plant equipment.....203
Metal-ion contamination, anti- .....198
Meter, pH .....203
Mill
  Pulverizing .....103
  Swing-sledge .....54
Mississippi, State of.....144
Mixer-depositor .....14-15
Mixers .....115
Monosodium glutamate .....12
Motors .....99, 201
Controls .....4, 103, 201
  Fluid drive .....126
  Splash-proof .....155
Nitrogen .....165
Nozzles
  Scrubbing .....188
  Spray .....198, 205
Ovens .....164
Overwrap, cellophane .....140
Package design service.....207
Packaging booklet .....141
Packaging machinery .....102
Packet, acetate-foil .....140
Paint, odorless .....198
Pallet, tube steel.....100
Paper, packaging .....52
Pipe & tubing, stainless....197
Power, standby, auto. panel..109
Pressing aid .....122
Printer, carton .....113
Process assemblies .....201
Process vat, pressure.....159
Processor, hollow-screw .....220
Puller, chain .....166
Pulverizers .....183
Pumps ....103, 105, 142, 201
  Centrifugal .....201
  Rotary .....185
  Screw .....201
Racks, storage .....205
Radio, 2-way .....152
Recorder, temperature .....203
Refrigeration, air-cond. equipment .....36, 168
  Controls .....207
Refrigeration equipment..176, 184
Rolls, crushing .....54
Sanitation materials ..131, 174 195
Scales .....22, 203
Separators, magnetic .....143
Sequestrene (chem.) .....205
Shaft-coupler .....113
Soaker, bottle .....88
Speed changers, miniature...203
Speed reducers, drives.....203
Spices .....203
Spice oils .....195
Stacking units .....205
Starch, wheat .....199
Steam-generators .....201
Steel
  Copper-clad .....99
  Stainless .....43, 56
Strainer, pipeline .....187
Sugar information .....207
Switch automatic .....101
Tank cars, RR.....6
Tanks, tile .....207
Tapes, pressure .....205
Temperature humidity test chambers .....203
Tile-grout materials .....207
Tin plate .....207
Tin .....206
Tower, cooling .....133
Transmitter, diff.-pressure ..101
Traps
  Air, steam .....201, 183
  Steam .....28, 108
Trucks
  Commercial .....106, 180
  Industrial .....88, 105, 163 171, 205
Truck bodies .....17
Truck bodies, refrig.....205
Tubing
  Flexible .....207
  Stainless .....34, 117
Ultra-violet equipment .....207
Uncaser, bottle .....89
Unloader, can .....20
Unscrambler table .....89
Valves .....23, 128, 216
  Cast iron .....123
  Fittings .....55
  Sanitation control .....16
V-belt .....4
Vinyl plastics .....135
Vitamins .....148
  A-color .....2
  B-12 .....193
Washer
  Bottle .....88
  Jar .....20
Waste disposer .....201
Water supply equipment.....203
Water treating equipment..88, 201
Weigher-feeders ...22, 109, 111 188
Welding, cutting tools.....205
Wheels, tooth-sprocket .....205
Wrapping mach. .....175
X-ray equipment .....203


## CIRCLE PAGE NUMBERS HERE, FILL IN OTHER SIDE, AND MAIL

### LISTINGS CONTINUED FROM OTHER SIDE

142C Labels
143a (ad) Mag. separator
143A Plastic-wire closures
143B Polyethylene bag
143C Cello. produce bag
144a (ad) BAWI info.
145a Equip. catalog
145b "Facts" booklet
146 D-10 blender
147 Homogenizers
150 Casters
151 Lubricants
152 Two-way radio
153 Shipping bookl.
154 Insulation mtls.
155 Splash-proof mot.
156 Convyr. belting
158 Flavor cat. C
159 Pressure proc. vat
160 Floor maint. bul.
161 Ice-makers
162 Cat. 200G
163 Ind. trucks
164 Ovens
165 Nitrogen
166a Chain hoist
166b Chain puller
167 Non-wov. fabric
168 Buls. 101, 202, 903, 110, 017
169 Stainl. castings
170 Brushes
171 Ind. truck
172 Flavor buls., cat.
173 Dust filter
174 Cleaning chem.
175 Wrap. mach.
176 Buls. 118, 119
177 Lubricants
178a Disintegrator
178b Convyr. belting
179 Gas
180 Trucks
182 Gaskets, packing
183a Steam traps
183b Pulverizer
184 Refrig. equip.
185a Steel belting
185b Rotary pump
186a Defoamer
186b Lubricant data
187a Convyr. cat. #4
187b Strainer
188a Weigher-feeder
188b Cat. 6-A, 6-C
189a Bul. ROL-2
189b Heat-trans. equip.
190a Filters
190b Wire-mesh belt.
191 Corrug. cartons
193 Vit. B-12
194 Colloids
195a Cleaning bul.
195b Spice oils
195c Bul. 508
196 Anti-contaminant
197a Cleated belting
197b Stainl. tube, pipe
198a Odorless paint
198b Spray nozzles
199a Plate freezer
199b Wheat starch
200 Bul. FE-153
201a (ad) Waste disposer
201b (ad) Steam generator
201A Bulletin 800
201B Pump bulletin
201C Motor control bul.
201D Bulletin 2403
201E Heat-exchanger bul.
201F Screen heater bul.
201G Screw-pump bul.
201H Bul. 52B6691A
201I Bul. 2225
201J Heat-exchanger cat.
201K Bul. 213
201L Bul. G-471
201M Gas cooking bul.
201N Bul. BW52300
201O Motor bul.
202 Filler
203a (ad) Wells, pumps
203b (ad) Spices
203A Gear drive bul.
203B Bul. 3570
203C Flavoring cat.
203D Bul. 18-W
203E Bul. 9603
203F X-ray bul.
203G Electric eye bul.
203H Cat. C-50
203I Leaflet 118
203J Bul. 528
203K Test chamber bul.
203L Bul. 447
203M Bul. 37
203N Bul. 100
203O Bul. 5204
203P Cat. 68-A
203Q Sealer-labeler bul.
204 Control instr.
205a (ad) Boxes, cartons
205b (ad) Cat. 22, 23
205A Cat. 54
205B Bul. 5221
205C Truck body cat.
205D The Lever, Vol. VI, No. 3
205E Bul. 2467
205F Insulation cat.
205G Hose bul.
205H Floor machine bul.
205I Leaflet A-70
205J Chemical cat.
205K Cleaning booklet
205L Bul. 330
205M Rubber coating bul.
205N Insulation leaflet
205O Aluminum manual
205P Pressure tape bul.
206 "Tin News"
207a (ad) Refrig. contr.
207A Bul. 251-2
207B Joint-grout bul.
207C Coatings chart
207D Cat. C2-3
207E Port. instr. bul.
207F Tile tank bul.
207G Foil container bul.
207H Cat. B11
207I Resin, bearing mtl. bul.
207J Packaging booklet
207K Corn in Industry
207L Embezzlement bklt.
207M Heat in Harness
207N Canning booklet
207O Sugar booklet
207P Ultra-violet bul.
207Q Tin-plate booklet
215 Maple flavor
219 Corrug. cartons
220 Hollow-screw processor

Coupon expires April 10, 1953

Other request .....

.....

***Don't forget . . . fill in name and address on other side***

January 1953

# Gaylord Boxes Are Protection in Action

Extra protection is a profitable investment that pays real dividends in reduced damage claims, and reduced packaging time.

Through every channel of distribution—from factory to warehouse to retailer, by train, truck or plane—Gaylord quality control and scientifically engineered design assures shipping containers that provide safe delivery of your product.

*Call the Gaylord sales office nearest you for prompt service.*

Gaylord Boxes

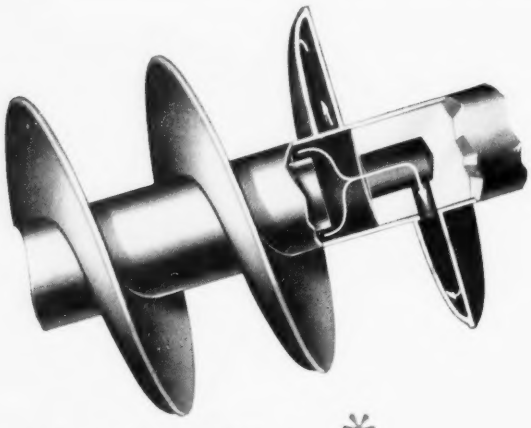
*Their unseen quality gives you an extra margin of safety.*

## GAYLORD CONTAINER CORPORATION

General Offices: ST. LOUIS • Branches: New York • Chicago • San Francisco • Atlanta • New Orleans • Jersey City • Indianapolis • Los Angeles Seattle • Houston • Oakland • Minneapolis • Detroit • Columbus • Fort Worth • Tampa • Dallas • St. Louis • Cincinnati • Des Moines Oklahoma City • Portland • Greenville • San Antonio • Memphis • Kansas City • Bogalusa • Chattanooga • Milwaukee • Waxahachie • New Haven Amarillo • Appleton • Hickory • Sumter • Greensboro • Jackson • Miami • Omaha • Mobile • Philadelphia • Little Rock • Charlotte • Cleveland

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT BAGS AND SACKS • KRAFT PAPER AND SPECIALTIES

*A great new advancement in heat exchangers...*



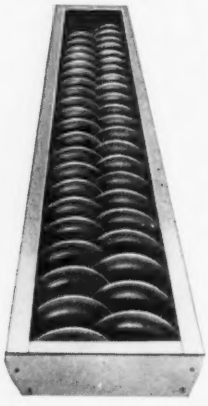
# THE holo-flite* PROCESSOR

(HOLLOW-FLITE)

## *A simpler, more compact way to cool slurries, solids or pastes—in continuous flow!*

Do you have processes where slurries, solids, pulps or pastes must be cooled or cooked? Do you know you can now handle such processes—*in continuous flow*—in as little as 1/5th the space required by other types of heat exchangers—and with many other important advantages?

***The newly-developed HOLO-FLITE Processor is the answer!***



## *what* IT IS!

Basically the HOLO-FLITE consists of two or more flights of hollow-bladed screw conveyors. The product to be processed moves in a trough around the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums—*as the product is continuously moved along in a bulk-flow without interruptions!*

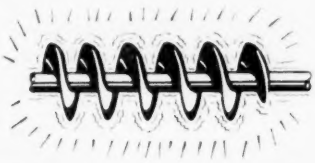
*Get the complete story on* HOLO-FLITE *savings and how this new advancement can simplify your processing operations. It is backed by the same organization that pioneered* COTTRELL *Precipitators and* MULTICLONE *Collectors—your assurance of complete dependability.*

**DETAILED INFORMATION!**
**New 8 page bulletin describing HOLO-FLITE features and applications will gladly be sent on request. Write, wire or phone for your free copy!**

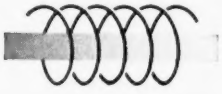
*Reg. T.M.

## *why* IT'S BETTER!

The HOLO-FLITE principle provides many important advantages in modern processing operations...



**ITS LARGE HEAT-TRANSFER SURFACE** requires far less space—as little as 1/5th the space required by other heat-exchange equipment. Further, flights can be "stacked" as high as desired to save floor space, simplify installation!



**ITS SLOW ROTATION IS SO GENTLE** that granular and powdered solids are handled with no dusting—little or no particle abrasion. Result—no dust recovery problems... simple, inexpensive installation.

**IT IS ADAPTABLE** to a wide range of applications—handles solids, pulps, pastes and slurries with equal ease. Heat transfer agent can be refrigerant, water or other fluids to provide a wide range of temperatures. Cooled products can be packed directly from HOLO-FLITE discharge, saving time, space and additional handling.

**IT CAN BE DESIGNED** to handle virtually any capacity by varying the diameter and length of the flights, and the number of "tiers."

**WESTERN Precipitation CORPORATION**

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

*Main Offices:* 1016 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA

CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2

1429 PEACHTREE ST. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4

PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL